

MINERALOGICAL ABSTRACTS

(Vol. 3, No. 10, June, 1928.)

Notices of Books.

EVANS (John W.). *The determination of minerals under the microscope with special reference to the interpretation of interference phenomena.* London (T. Murby & Co.), 1928, pp. xii + 110, 5 pls., 33 text-figs. Price 7s. 6d.

This is a clearly written elementary text-book on the principles of crystal-optics for the use of students of petrography. It is an extension of the author's papers on this subject published in 1909 (Proc. Geol. Assoc.) and 1915 [M.A. 1-227], and incorporating matter from his papers in this Magazine in 1916-1917. The optical indicatrix is simply explained, and on this the reasoning throughout is based. In certain points a special phraseology is adopted which will scarcely prepare the student for reading other books and papers on the subject. To apply the terms 'fast' and 'slow' to crystals (meaning those of negative and positive sign), to optic axial angles (meaning acute and obtuse), and to vibration-directions (α and γ) seems to be an almost unnecessary complication. The useful and well-established term interference-figure is suppressed, the author preferring 'directions image', but it creeps in unexplained on p. 101. Convergent light is not recognized, but we find 'hodoscope'. The title of the book would suggest a work on determinative mineralogy, but, except for a few on p. 25, there is no mention of minerals throughout the volume. A second volume dealing with the optical characters of individual minerals is, however, promised.

L. J. S.

WINCHELL (Alexander Newton). *The optic and microscopic characters of artificial minerals.* University of Wisconsin Studies in Science, no. 4, Madison, 1927, xv + 215 pp., 10 figs. Price \$ 1.50.

While collecting data for Part II of his Optical Mineralogy [M.A. 3-413] the author had accumulated much material relative to a host of other inorganic compounds. This has now been extended to include all the available optical data, and a valuable book of reference is the result. The book will be of more use to chemists than to mineralogists, but owing to the misleading title it will very likely be overlooked by them.

Such substances as $\text{BaPt}(\text{CN})_4 \cdot 4\text{H}_2\text{O}$, 'Tutton's selenate group', or $(\text{CN}_3\text{H}_5)_2 \cdot \text{H}_2\text{SO}_4 \cdot \text{Al}_2(\text{SO}_4)_3 \cdot 12\text{H}_2\text{O}$ [i.e. guanidine aluminium sulphate] will surely never be found as minerals. The arrangement is a mineralogical one following Dana, under sulphides, carbonates, sulphates, &c., and the substances are referred to by chemical formulae alone, though their names appear in the index to the volume. Detailed determinative tables are also given in which optically isotropic and anisotropic substances are arranged in order of magnitude of n and of n_ω or n_β , and much other useful information (crystal-system, cleavage, optical orientation, birefringence, optic axial angle, sp. gr.) is added for reference. Such a statement as ' CaCO_3 has four crystal forms' is open to more than one interpretation. L. J. S.

BUTTGEBACH (H.). *Les minéraux et les roches. Études pratiques de cristallographie, pétrographie et minéralogie.* 5^e édit., Paris (Dunod) and Liège (Vaillant-Carmanne), 1928, xx + 757 pp., 4 pls., 592 text-figs.

The first edition of this popular text-book appeared in 1917, and a third edition in 1924 [M.A. 2-321]. Various small additions have been made bringing the work up to date, and the appendix on mathematical crystallography is now paged on after the index, with a new appendix on the calculation of the 'parameters' of rock analyses. L. J. S.

[VERNADSKY (V. I.)] Вернадский (В. И.). Очерки геохимии. [*Sketch of geochemistry.*] Москва-Ленинград (Гос. изд.) [Moscow & Leningrad (State publication)], 1927, 368 pp. Price 6 rubl.

This is a rewritten and enlarged Russian edition of the author's '*La géochimie*' (Paris, 1924) [M.A. 2-416]. P. N. C.

GROSS (Rudolf). *Experimentelle Mineralogie.* Handbuch der biologischen Arbeitsmethoden, herausg. von Emil Abderhalden, Abt. X, Methoden der Geologie, Mineralogie, Paläobiologie, Geographie, Heft 6, Berlin & Wien (Urban & Schwarzenberg), 1928, pp. 659-750, 2 pls., 63 text-figs. Price 5 Mk.

This is published as a separate pamphlet (Lieferung 257) in what is evidently a very extensive series of monographs. The title 'experimental mineralogy' is misleading. We expected to find something new and interesting, but find rather a good encyclopaedic article on crystallography in general, somewhat on the lines of a condensed text-book. Geometrical and optical crystallography and the X-ray methods of determining the structure of crystals are briefly dealt with. L. J. S.

RABINOWITSCH (Eugen). *Die Edalgase*. Handbuch der Anorganischen Chemie, herausg. von R. Abegg, Fr. Auerbach, & I. Koppel, Leipzig (S. Hirzel), 1928, vol. 4, Abt. 3, Teil 1, xii + 522 pp., 50 figs. Price 45 Mk. (bound 48 Mk.).

This is an exhaustive treatise bringing together all that is known about the rare gases argon, helium, krypton, neon, xenon, and radioactive emanations. Their sources are dealt with in detail, including occurrences in springs and volcanic gases, in minerals, rocks, and meteorites. A very detailed bibliography (pp. 461-514) is classified according to subject matters.

L. J. S.

Museums and Collections.

PRIOR (G. T.). *A guide to the collection of meteorites, with an alphabetical list of those represented*. British Museum (Natural History), London, 1926, 43 pp., 1 plan. Price 6d.

This is an abbreviated form of the 'Introduction to the study of meteorites' by L. Fletcher [M.A. 1-145], with some additional matter from the recent literature concerning the mineral composition, method of classification, and mutual relations of meteorites. An alphabetical list of meteorites represented in the collection is followed by a list of the more important synonyms, a list of casts of meteorites in the collection, and a list of British meteorites.

L. J. S.

PRIOR (G. T.). *Appendix to the catalogue of meteorites, with special reference to those represented in the collection of the British Museum (Natural History)*. London (British Museum), 1927, 48 pp. Price 2s.

An alphabetical list supplementary to the catalogue published in 1923 [M.A. 2-97]. 142 new falls are listed, bringing the total of known meteorite falls up to 992.

L. J. S.

SMITH (W. Campbell). *Catalogue of the rock collections in the Mineral Department of the British Museum (Natural History) arranged geographically. Part I, Africa*. London (British Museum), 1928, xiv + 51 pp. Price 2s.

After a short historical introduction, a list of the many sets of rock specimens is given under countries and districts. A brief account is given of the nature of the material in each set, by whom and when collected, and how acquired, together with references to the literature especially when the material has been described. In many cases the specimens were collected on pioneer expeditions, and, dating back over a century, they are often of historical interest. The number of specimens

in each set is stated, the total for Africa being 7533. This topographical collection, distinct from the systematic collection of rocks, is stored in drawers and is available for comparison and study. L. J. S.

HARRIS (Stella West). *Some geological collections in the Liverpool Public Museum.* Proc. Liverpool Geol. Soc., 1925, vol. 14, pp. 181-195, 3 pls.

A brief mention is made (pp. 194-195) of the mineral collection of William Phillips [1775-1828] and of the collection of silica and other ornamental stones bequeathed by the Earl of Derby in 1893. L. J. S.

MERRILL (George P.). *Two noted mineral collections.* The Scientific Monthly, New York, 1927, vol. 25, pp. 314-320, 7 figs.

A short account of the private collections of F. A. Canfield [1849-1926] and W. A. Roebbling [1837-1926], with mention of some of the more noteworthy specimens and biographical notes. These collections are now in the United States National Museum at Washington. [See Min. Mag., vol. 21, pp. 231, 250.] L. J. S.

Das Museum Bally-Prior in Schönenwerd bei Aarau. Aarau, 1922, 127 pp., 1 pl.

The late Eduard Bally-Prior (1847-1926) [Min. Mag. 21-229] was for many years an enthusiastic collector of minerals, and he possessed means for purchasing good specimens. His private collection was housed in a special building at Schönenwerd in Switzerland, and shortly before his death he presented this museum to the canton. Ethnographical objects and geological and rock specimens are included, but the larger part consists of minerals of which there are 7241 specimens (1248 of which are Swiss) representing 1500 species and varieties. The guide-book gives an interesting account of these collections. L. J. S.

DAUTWITZ (Werner). *Einführung in die Meteoritenkunde an Hand der Meteoritensammlung des Museums Bally-Prior, Schönenwerd.* Aarau, 1922, 50 pp., 2 figs.

This brief introduction to the study of meteorites is followed by a list giving particulars of the 41 falls represented in the collection. A 20,000-gram mass of Cañon Diabolo and one of 11,720 of Mukerop are included in the collection. An appendix gives notes on the microscopical examination of some of the meteoric irons. L. J. S.

SIGMUND (A.). *Die Meteoritensammlung des steierr. Landesmuseums „Joanneum“ in Graz*. Jahresber. Steierr. Landesmus. Graz, 1927, vol. 113-115 (for 1924-1926), pp. — (Reprint 8 pp.).

The mineral collection of the archduke Johann, which in 1812 formed the nucleus of the provincial museum of Styria, contained a 1929-gram mass of the Krasnojarsk pallasite. Later additions are enumerated in order of date, and a list is given of the 44 meteorite falls now represented in the collection.

L. J. S.

[FERSMAN (A. E.)] Ферсман (А.). *Минералогический Музей. Академия Наук, Ленинград*, 1925, 25 pp., 4 figs.

— *Musée de minéralogie. Académie des Sciences, Leningrad*, 1925, 16 pp., 4 figs.

The Russian and French editions of this pamphlet were issued in connexion with the bicentenary celebration of the Russian Academy of Sciences (1725-1925). A brief history is given of the collections, which originally formed part of the 'Kunstkammer' founded by Peter the Great in 1716, and were subsequently transferred to the Academy of Sciences. An idea is given of the contents of each room and of special exhibits. Rather than a mere array of the species of minerals, the collections now aim at illustrating modes of occurrence and geological processes; and information respecting localities and literature for each species is filed in card-indexes.

P. N. C.

MIERS (Sir Henry A.). *Minerals as museum exhibits*. Museums Journ. London, 1927, vol. 27, pp. 110-118.

To the ordinary visitor a mineral collection is often unintelligible, and something is required that will excite interest. For this purpose an exhibit to illustrate the growth of crystals is suggested.

L. J. S.

MIERS (Sir Henry). *A report on the public museums of the British Isles (other than the national museums)*. Edinburgh (T. & A. Constable), 1928, 213 pp., 8 pls.

This report to the Carnegie United Kingdom Trustees gives in Part I an interesting 'general survey' of the existing conditions and in Part II many far-reaching 'criticisms and suggestions'. An appendix (pp. 84-209) gives a useful list, with brief particulars, of 530 museums (many of them merely a miscellaneous collection of curios in a small room attached to a public library) on which the report is based. The report is, of course, a general one, and contains no specialized information. Minerals, for example, are mentioned for only seven of the 530 museums—the unexpected places being Millom and Stromness. It would be interesting

to know the present whereabouts of many old collections of minerals. But here the outlook is educational rather than conservational.

L. J. S.

LOWE (E. E.). *A report on American museum work*. Edinburgh (T. & A. Constable), 1928, 50 pp., 11 pls.

This report is published by the Carnegie United Kingdom Trustees as a companion to the Report on British museums by Sir Henry Miers. It records the impressions of a two months' visit in 1927 to 52 museums in the United States and Canada, and gives some useful items of museum technique.

L. J. S.

Historical.

[TVALDCHRELIDZE (Aleksandre A.)] თვალჭრელიძე (ალექსანდრე). ორი მინერალის ისტორიიდან. [*History of two minerals.*] ტფილისის უნივერსიტეტის მუშავე (Bull. Univ. Tiflis), 1925, vol. 5, pp. 323-341, 30 figs. [Georgian.]

A popular historical sketch of the knowledge of the refraction of light, with references to Ptolemy, Alhazen, Kepler, Snell, and Descartes; double refraction; and the use of Iceland-spar and tourmaline in polarizing apparatus. Mention is made of a recent discovery of Iceland-spar in the andesitic-basaltic rocks of the extinct volcano Shav-Nabad in the Telet Mts., Trans-Caucasia.

P. N. C.

HOLMYARD (E. J.) & MANDEVILLE (D. C.). *Avicennae de congelatione et conglutinatione lapidum*, being sections of the *Kitāb al-Shifā'*. The Latin and Arabic texts edited with an English translation of the latter and with critical notes. Paris (Paul Geuthner), 1927, ix + 86 pp. Price 15s.

The 'Mineralia' often attributed to Aristotle is a translation from the *Kitāb al-Shifā'* (The Book of the Remedy) of Avicenna = Ibn Sinā [A.D. 980-1037]. The 'Section on stones and mountains' contains some sound geology, but the short 'Section on the formation of minerals' is confused with alchemy. The author denied the possibility of transmuting metals. Mineral bodies are roughly divided into four groups: stones, fusible substances, sulphurs, and salts. Stones have been congealed from aqueous solution by cold or by dryness. A circumstantial account is given of a contemporary fall of a mass of about 300 lb. of meteoric iron at Jūzjānān [in Herat, Afghanistan]; and there is mention of a similar fall of a large stone (not iron) in the mountains of Tabaristān.

L. J. S.

GROTH (P.) [1843-1927]. *Vorgeschichte, Gründung und Entwicklung der Zeitschrift für Kristallographie in den ersten fünfzig Jahren.* Zeits. Krist., 1927, vol. 66, pp. 1-21.

Previous to the founding of the 'Zeitschrift für Kristallographie und Mineralogie' by Prof. Groth in 1877, crystallographical papers in Germany had been published mainly in the 'Annalen der Physik und Chemie' (Poggendorff) and mineralogical papers in the 'Neues Jahrbuch für Mineralogie, &c.' The want of a special journal devoted to crystallography was then beginning to be felt, but in order to gain a circulation it was at first necessary to add also mineralogy. When, in 1921, the editorship was taken over by Prof. P. Niggli, crystallography had made such rapid advances, due to the new X-ray methods of investigation, that a journal devoted to it entirely could be self-supporting, and the title was accordingly changed to 'Zeitschrift für Kristallographie', as originally planned by Groth. In the present note, marking the jubilee of the journal, Groth recounts the support he had received from workers in many countries during his forty-four years of editorship. With this first number of vol. 66 some further changes are introduced to make the journal still more international in character. On the wrapper the names of eighteen well-known workers (in twelve countries) are given as associate editors, and two of the thirteen papers are printed in English. L. J. S.

GOßNER [Balthasar]. *Die Mineralogische Staatssammlung und das Mineralogische Institut der Universität. Jubiläums-Festschrift der Universität München, 1926, pp. 292-295.*

The Bavarian State collection of minerals had its beginning with the appointment in 1797 of Matthias Flurl as professor of natural history and chemistry in the Academy of Sciences of Munich. In 1823 it became more closely associated with the University of Munich. The first professor of chemistry and mineralogy in the University, previously in Landshut, was J. N. Fuchs who, with his appointment in 1823, came to Munich also as conservator of the mineral collection. In this dual post he was succeeded by F. Kobell (1856-1882), P. Groth (1883-1924), and B. Gossner (1924-). L. J. S.

SLAVÍKOVÁ (Ludmila). *Česká mineralogie, zvláště v Národním Muzeu a musejních časopisech.* [Czech mineralogy, especially in the National Museum and in the museum journal.] Časopis Národního Muzeu, 1926, vol. 100, pp. 43-58, 3 pls.

In this centenary volume an historical sketch is given of the mineralogical collections of the national museum at Prague. A bibliography is

given of papers published on museum material, and biographies and portraits are added of F. X. M. Zippe, E. Bořický, K. Vrba, and V. Wraný. F. S.

VENDL (Aladár). *A Magy. Tud. Akadémia tagjainak hatásn az ásványtan és közzettan fejlődésére hazájsskban.* [The influence of the members of the Hungarian Academy of Sciences on the development of mineralogy and petrology in our native country.] Budapest, 1926, 32 pp.

A summary of scientific work in mineralogy and petrology since the foundation, in 1825, of the Hungarian Academy of Sciences. K. Z.

FOWLES (G.). *The history of witherite.* Chem. News, London, 1927, vol. 135, pp. 309-310.

The locality of the original witherite examined by W. Withering is given in some chemical treatises as Leadhills, Scotland, and in some mineralogical books as Anglezarke, Lancashire. It is pointed out that in W. Withering's paper (Phil. Trans. Roy. Soc. London, 1784, vol. 74, p. 293) the locality was given as Alston Moor, Cumberland. L. J. S.

ZENZÉN (Nils). *On the first use of the term »feldtspat» (= feldspar etc.) by Daniel Tilas in 174C.* Geol. För. Förh. Stockholm, 1926, vol. 47 (for 1925), pp. 390-405.

An interesting historical essay on the origin of the name feldspar. The form 'feldtspat' was first given by D. Tilas (Akad. Handl. Stockholm, 1740, vol. 1, p. 199). He gave no derivation, but no doubt the name has reference to the presence of the spar (spath) in tilled fields (Swedish, feldt), the soil of which was from the disintegration of rapakivi granite. The form 'feldspath' was the German equivalent; and 'felspar' is based on R. Kirwan's supposition (1794) that the name was of German origin and derived from Fels, rock. L. J. S.

ZENZÉN (Nils). *Geschichtliches über Cuban(it) von Tunaberg nebst Bemerkungen über eine unberechtigte Namensänderung desselben in Chalmersit.* Geol. För. Förh. Stockholm, 1926, vol. 47 (for 1925), pp. 385-389.

The cubanite from Tunaberg, Sweden [M.A. 2-235], was mentioned by A. F. Cronstedt in 1758 under the name 'Blekgul Koppar-kies' (pale-yellow copper-pyrites). The several recent papers on the identity of cubanite (Cuban of A. Breithaupt, 1843) and chalmersite

(of E. Hussak, 1902) are reviewed, and the use of the latter name is objected to.

L. J. S.

KALB (Georg) & BENDIG (Maximiliane). *Cuban oder Chalmersit?*
Centralblatt Min., Abt. A, 1926, p. 25. [Cf. M.A. 2-235.]

The authors prefer the name cuban (A. Breithaupt, 1843) rather than chalmersite (E. Hussak, 1902).

L. J. S.

New Minerals.

FISCHER (Walther). *Ergänzungen zu den „Mineralogischen Tabellen“ von P. Groth† und K. Mieleitner† (1921) für die Jahre 1921-1927. (Neue Mineralnamen.)* Sitzungsber. Abhandl. Naturwiss. Gesell. Isis, Dresden, 1928, Festschrift Richard Baldauf, pp. 1-19.

An alphabetical list to serve as a supplement to Groth and Mieleitner's Tables [M.A. 2-146], giving for each mineral the chemical formula, crystal system, and bibliographical reference to abstract journals. In addition to new names, a few other minerals are listed giving supplementary information. [A few of the names are given incorrectly; e.g. Cornuccit for Comuccit, Seebachit for Lerbachit.]

L. J. S.

PALACHE (C.), BAUER (L. H.), & BERMAN (H.). *Larsenite and calcium-larsenite, new members of the chrysolite group from Franklin, New Jersey.* Amer. Min., 1928, vol. 13, pp. 142-144.

These new minerals occur in veinlets in the massive ore together with clinohedrite, hardystonite, willemite, &c. Larsenite forms slender striated prisms, rarely plates, which are colourless and transparent with adamantine lustre. The crystals are orthorhombic with $a:b:c = 0.4340:1:0.5324$ and the prominent forms (010), (012), (110), (142), (9.8.18), also (100), (122), (132), (101), (111), (131); cleavage (120) good. Optic axial plane (001), $Bx_a(a) \perp (100)$, $2V$ 80° about, negative; α 1.92, β 1.95, γ 1.96; sp. gr. 5.90. Analysis I gives the formula $PbZnSiO_4$, and the other properties also show a relation to the olivine group. Calcium-larsenite is massive, white and opaque with greasy lustre; sp. gr. 4.421; optically negative with $2V$ 5° , α 1.760, $\beta = \gamma$ 1.769 (other material, not analysed, gave α 1.762, β 1.770, γ 1.774, $2V$ 40°). Analysis II gives the formula $(Pb,Ca)ZnSiO_4$ with about half the lead of larsenite replaced by calcium.

	SiO ₂ .	PbO.	ZnO.	FeO.	MnO.	CaO.	MgO.	H ₂ O.	Total.
I.	16.87	56.66	22.74	0.10	0.14	2.42	0.20	0.76	99.89
II.	24.10	27.63	30.61	0.48	0.57	16.36	0.23	0.12	100.10.

L. J. S.

FOSHAG (William F.) & HESS (Frank L.). *Rossite and metarossite; two new vanadates from Colorado*. Proc. United States National Museum, 1927, vol. 72, art. 11, 12 pp., 2 figs.

Clear glassy kernels of yellow rossite [M.A. 3-239] are found in pale yellow flaky metarossite filling veinlets in sandstone in Bull Pen Canyon, San Miguel Co. On exposure to air rossite loses water and passes into metarossite. Both are soluble in water, and rossite crystallizes from the solution. Analysis of rossite gave V_2O_5 58.00, CaO 18.00, MgO 0.14, insol. 1.60, H_2O 22.90 = 100.64; formula, $CaO.V_2O_5.4H_2O$. The recrystallized material is triclinic with prismatic or tabular habit and the forms a (100), b (010), c (001), m (110), y ($\bar{1}01$); α $98^\circ 18'$, β $97^\circ 24'$, γ $89^\circ 34'$ (polar elements also given); cleavage (010) good; twins on (100); α 1.710, β 1.770, γ 1.840, 2V large; sp. gr. 2.45, H. 2-3. Metarossite is soft and friable with dull pearly lustre; α 1.840, high dispersion. Analysis gave V_2O_5 64.08, CaO 20.04, MgO 0.10, insol. 2.72, H_2O 13.56 = 100.50; formula $CaO.V_2O_5.2H_2O$. Other hydrated calcium vanadates are hewettite and pascoite. Rossite has been prepared artificially by heating hewettite in water with excess of calcium carbonate.

L. J. S.

SHANNON (Earl V.). *Ammoniojarosite, a new mineral of the jarosite group from Utah*. Amer. Min., 1927, vol. 12, pp. 424-426.

This occurs as small nodules associated with tschermigite, epsomite, &c., in a lignitic shale on the west side of the Kaibab fault in southern Utah. It is pale ochre-yellow and under the microscope shows minute flattened grains, some with hexagonal outlines; ω 1.800, ϵ 1.750 about. Analysis gave SO_3 34.49, TiO_2 trace, Fe_2O_3 49.30, Al_2O_3 0.02, CaO 0.05, MgO 0.13, Na_2O 0.22, K_2O 1.56, $(NH_4)_2O$ 4.23, PbO trace, Ag_2O nil, insol. 0.76, H_2O 9.86 = 100.62, agreeing with the formula $(NH_4)_2O.3Fe_2O_3.4SO_3.6H_2O$. The mineral belongs, with jarosite, natrojarosite, plumbojarosite, and argentojarosite, to the large isomorphous group alunite-beudantite.

L. J. S.

POITEVIN (Eugene). *A new Canadian occurrence of phosphorite from near François Lake, British Columbia*. Bull. Geol. Survey Canada, 1927, no. 46 (Geol. Ser. 47), pp. 2-12, 2 pls., 3 text-figs. [Part of a paper, pp. 1-21, entitled *Contributions to Canadian mineralogy*, 1926.]

Phosphorite nodules, 2-8 inches across, form a botryoidal mass filling a fissure in lava of Tertiary age. They consist of alternate concentric layers of pale brown *collinsite* and dark brown 'quercyite' around frag-

ments of andesite, and are coated with an asphalt (sp. gr. 1.06) referred to wurtzilite. The new mineral collinsite shows a radial aggregate of blades with four cleavages the angles between which are c_0c_1 $88^\circ 40'$, c_1c_2 72° , c_1c_3 49° , c_2c_3 69° . These angles and also the optical orientation prove the mineral to be triclinic. Optically positive, $2V$ 80° , α 1.632, β 1.642, γ 1.657. The mineral is readily soluble in acids, and fusible before the blowpipe (the 'quercyte' decrepitates and does not fuse); sp. gr. 2.95, H. $3\frac{1}{2}$. Analysis I by E. A. Thompson gives the formula $\text{Ca}_2(\text{Mg}, \text{Fe})\text{P}_2\text{O}_8 \cdot 2\frac{1}{2}\text{H}_2\text{O}$. Collinsite thus represents the magnesium mineral corresponding with messelite $[\text{CaFe}_2\text{P}_2\text{O}_8 \cdot 2\frac{1}{2}\text{H}_2\text{O}]$. The material of the 'quercyte' layers differs from the original quercyte from France. It is fibrous and consists of a single mineral, near francolite or perhaps a new mineral, with sp. gr. 3.04, H. $4\frac{1}{2}$, α 1.613, β 1.626, γ 1.629, $2V$ 5° – 10° . Analysis II by E. A. Thompson agrees with the formula $\text{Ca}_3\text{P}_2\text{O}_8 \cdot \text{CaCO}_3 \cdot \frac{1}{2}\text{CaF}_2 \cdot \text{H}_2\text{O}$. Small amounts of vivianite, pyrite, calcite, quartz, and zeolites are associated with the quercyte-collinsite nodules.

	P_2O_5 .	CaO.	FeO.	Fe_2O_3 .	Mn_2O_3 .	MgO.	F.	CO_2 .	H_2O .	Total.*
I.	39.83	32.18	6.86	0.80	0.36	6.34	0.27	0.23	12.43	99.86
II.	34.96	50.22	1.90	0.12	0.12	0.62	1.83	5.45	4.20	100.26

* Totals less O for F; also: I, Al_2O_3 0.39, SiO_2 0.10, C 0.18; II, Al_2O_3 0.60, SiO_2 0.19, C 0.82.

L. J. S.

ELLSWORTH (H. V.). *A mineral related to samarskite from the Woodcox mine, Hybla, Ontario.* Amer. Min., 1928, vol. 13, pp. 63–65.

— *A mineral related to samarskite from Parry Sound, Ontario.* Ibid., pp. 66–68.

These occur with other radioactive minerals in pegmatite veins. They are black with submetallic lustre, no cleavage, H. $6\frac{1}{2}$, and are optically isotropic. Being high in calcium they are named *calciosamarskite*. Analyses gave: I, from Hybla, sp. gr. 4.738; II, from Parry Sound, sp. gr. 4.485. The $\text{Pb}/(\text{U} + 0.38 \text{ Th})$ ratios are 0.04 and 0.03 respectively; these values are low, probably due to alteration, as is also suggested by the high silica.

	Nb_2O_5 .	Ta_2O_5 .	TiO_2 .	SiO_2 .	ZrO_2 .	SnO_2 .	ThO_2 .	UO_2 .	UO_3 .	PbO.	$(\text{Ce}, \text{La}, \text{Di})_2\text{O}_3$.
I.	43.32	2.54	2.50	2.39	0.02	1.49	3.34	9.00	1.67	0.44	1.68
II.	43.50	4.86	1.43	1.92	0.24	0.48	2.16	10.0	3.06	0.33	4.04

	$(\text{Yt}, \text{Er})_2\text{O}_3$.	Al_2O_3 .	Fe_2O_3 .	FeO.	MnO.	BeO.	CaO.	MgO.	H_2O (– 110°).	H_2O (+ 110°).	Total.
I.	11.38	0.16	7.67	0.21	0.04	0.26	7.56	0.02	0.40	3.24	99.33
II.	10.71	0.65	3.01		0.23	0.49	4.76	0.14	0.68	5.76	98.82

L. J. S.

RIMANN (E.). *Bodenbenderit, ein neues Mineral aus Argentinien.*

Sitzungsber. Abhandl. Naturwiss. Gesell. Isis, Dresden, 1928,

Festschrift Richard Baldauf, pp. 42-51.

Albite-fluorite veins near granite in the Sierra Chica, Sierra de Córdoba, contain also pennine, mica, helvine [M.A. 3-150], garnet, idocrase, and a garnet-like mineral called bodenbenderite. The last forms flesh-red dodecahedra (110) up to 10 mm. across with small (211), and is optically isotropic with $n > 1.77$; sp. gr. 3.3-3.5 (the lower value due to inclusions of fluorite, pennine, mica, and carbon dioxide), H. 6-6½. The mineral fuses to a black slaggy glass. Analysis by E. Gruner gave (the figures in brackets after deducting 16.7 % impurities): SiO₂ 20.2 (21.02), TiO₂ 7.4 (8.74), U₃O₈ 0.4 (0.47), Al₂O₃ 10.7 (10.16), (Yt,Er)₂O₃ 13.2 (15.59), Fe₂O₃ 1.2 (0.35), FeO 0.3 (0.35), MnO 34.3 (40.49), MgO 0.3 (0.35), CaO 5.5 (2.48), Na₂O 0.3, K₂O 0.2, F 2.3, H₂O 1.3, CO₂ 3.8, Total 100.4 (100.0), giving the formula 4RO.R₂O₃.3RO₂ or (Mn,Ca)₄Al[(Al,Yt)O][(Si,Ti)O₄]₃, which is compared with that of beckelite. From the analyses of the portions soluble (63.9 %) and insoluble in hydrochloric acid the composition is also expressed as a mixture of plazolite and idocrase.

L. J. S.

EDELMANN (F.). *Kolbeckit, ein neues sächsisches Mineral.* (Vorläufige Mitteilung.) Jahrb. Berg- und Hüttenw. Sachsen, 1926, vol. 100, pp. A 74-A 75.

A few small crystals of this mineral have been found in the quartz-wolframite vein in the Sadisdorf copper mine near Schmiedeberg. They are cyan-blue to blue-grey with vitreous to pearly lustre and white streak; sp. gr. 2.39, H. 3½-4; monoclinic with few forms and twinned on (100) with an orthorhombic habit; cleavage (010) distinct; pleochroism strong. The mineral is difficultly soluble in acids and contains much Be with P₂O₅ and SiO₂, little Al and Mg, and traces of Cu, Fe, SO₃. It appears to be a phosphate or silico-phosphate of beryllium.

L. J. S.

[BILIBIN (G. A.)] Билибин (Г. А.). Алюмогидрокальцит—новый минерал. —BILIBINE (G.). *Alumohydrocalcite—a new species.* Зап. Росс. Мин. Общ. (Mém. Soc. Russe Min.), 1926, ser. 2, vol. 55, pp. 243-258. [Russ. with English summary, p. 258.]

This was found in the Khakassky district [Siberia] with allophane, volborthite, copper carbonates, cuprite, native copper, limonite, calcite, and wad. It has the appearance of chalk and is white or pale bluish, or

occasionally violet, grey, or pale yellow. It is brittle, H. $2\frac{1}{2}$, sp. gr. 2.231. Analyses give the formula $\text{CaO} \cdot \text{Al}_2\text{O}_3 \cdot 2\text{CO}_2 \cdot 5\text{H}_2\text{O}$.

	Al_2O_3	Fe_2O_3	FeO	CaO	P_2O_5	SiO_2	CO_2	H_2O	$\text{H}_2\text{O}(\text{hydr.})$	Total
I.	28.60	0.45	0.35	15.46	0.74	0.67	25.20	26.40	2.48	100.35
II.	30.00	—	—	16.28	—	2.40	—	51.82	—	100.52
III.	31.77	—	—	15.62	—	0.27	—	51.88	—	99.54

I, also MgO , K_2O , Na_2O traces.

The mineral readily dissolves in acids, and is decomposed by alkalis with separation of CaCO_3 . Boiling water causes the separation of CaCO_3 and $\text{Al}(\text{OH})_3$. Under the microscope the mineral is seen to consist of small radially-fibrous spherulites. The fibres give extinctions of 0° or $7-10^\circ$, and have a perfect cleavage (100) and a less perfect cleavage (010). α 1.485, β 1.553, γ 1.570, $2V$ $50-55^\circ$, negative. The dehydration curve shows breaks at $180-190^\circ$, 350° , and less distinctly at $740-800^\circ$, and the formula is consequently written as $\text{CaH}_2(\text{CO}_3)_2 \cdot 2\text{Al}(\text{OH})_3 \cdot \text{H}_2\text{O}$, analogous to that of dundasite $[\text{PbH}_2(\text{CO}_3)_2 \cdot 2\text{Al}(\text{OH})_3]$. The mineral is related to dawsonite (and hovite). It appears to have originated by the action of calcium bicarbonate solutions on allophane, but attempts to prepare it artificially were not successful.

P. N. C.

[ANSHELES (O. M.) & VLODAVETZ (N. I.)] Аншелес (О. М.) и Влодавец (Н. И.). Стронциевый минерал из Тихвинских бокситов.—ANSHELESS (J. M.) and VLODAVETZ (N. J.). *New strontium mineral from bauxite deposit in Tikhvin district, Russia*, Зап. Росс. Мин. Общ. (Mém. Soc. Russe Min.), 1927, ser. 2, vol. 56, pp. 53-60. [Russ. with English summary, p. 60.]

Almond-shaped bodies 5 mm. across from the bauxite of the Tikhvin district (formerly govt. Novgorod) have H. $4\frac{1}{2}$, sp. gr. 3.32, n 1.62. The material is optically anisotropic and is insoluble in acids. Analysis gave P_2O_5 18.05, SO_3 8.47, Al_2O_3 31.14, Fe_2O_3 2.25, SrO 24.43, SiO_2 0.56, TiO_2 0.16, H_2O 12.54, total 97.60. Formula, $2\text{SrO} \cdot 3\text{Al}_2\text{O}_3 \cdot \text{P}_2\text{O}_5 \cdot \text{SO}_3 \cdot 6\text{H}_2\text{O}$ (or $7\text{H}_2\text{O}$?). The mineral is near svanbergite and harttite, and is named *tikhvinite* (ТИХВИНИТ).

P. N. C.

[TANATAR (I. I.)] Танатар (И. И.). К вопросу о моноклинном диаспоре. [On the question of monoclinic diasporite.] Бюллетени Геолого-Минералогического Кружка при Днепропетровском Горном Институте, Днепропетровск [Bull. Geol.-Min. Circle, Dnepropetrovsk [= Ekaterinoslav] Mining Institute], 1927, p. 9.

Some errors are pointed out in the optical description of the 'monoclinic diasporite' to which the name tanatarite has been given [M.A. 3-

237]. For example, the plane of the optic axes coincides with the direction of perfect cleavage and $2V$ is $83-84^\circ$. The monoclinic symmetry is, however, confirmed. P. N. C.

ECKERMAN (Harry von). *A new manganese-chlorite from Långban*. Geol. För. Förh. Stockholm, 1927, vol. 49, pp. 450-454.

Rough crystals (3×1 cm.) of an orange-red mineral resembling mica, but shown to be a chlorite of the pennine group, gave in two samples: I, sp. gr. 2.775, α 1.5717, β 1.5719, γ 1.5751 (Na), biaxial with varying angle, positive, (anal. I); II, sp. gr. 2.769, ω 1.5724, ϵ 1.5745 (Na), positive, (anal. II by K. Almström). These analyses are calculated as $\text{Sp}_{58}\text{At}_{42}$; or, if the manganese is all Mn_2O_3 , as $\text{Sp}_{56}\text{At}_{44}$.

	SiO_2	Al_2O_3	Fe_2O_3	MnO	MgO	Na_2O	K_2O	H_2O (+110°)	H_2O (-110°)	Total
I.	32.51	16.17	0.56	1.06	35.72	0.96	0.51	12.59	0.12	100.20
II.	31.85	15.43	0.67	1.02	36.09	0.18	0.25	12.88	1.07	99.97*

* In II also CaO 0.48, F 0.09.

L. J. S.

STAHL (W.). *Ein neues Kobaltmineral. (Eine Abart des Sychnodymits.)* Metall u. Erz, Halle, 1927, vol. 24, p. 593.

A black coke-like mineral from the Siegen district in Westphalia, showing small cubic crystals (*a o d*) in association with tetrahedrite, pyrite, and quartz, gave Co 26.80, Ni 5.70, Cu 23.46, Fe 3.86, S 39.28, insol. 0.47, total 99.57, sp. gr. 4.58, agreeing with the formula $(\text{Co,Cu,Ni,Fe})_4\text{S}_5$. It is a variety of sychnodymite (of H. Laspeyres, 1891) from the same district, differing in containing rather less cobalt and correspondingly more copper and iron. L. J. S.

TILLEY (C. E.). *A monticellite-nepheline-basalt from Tasmania: a correction to mineral data.* Geol. Mag., 1928, vol. 65, pp. 29-30.

The name 'shannonite' [M.A. 3-273] is withdrawn, as a re-examination of the rock shows the doubtful mineral (n 1.66-1.68, negative, $2V$ 67°) to be monticellite. The rock is composed of nepheline 27, augite 27, monticellite 27, olivine 14 %, with biotite, apatite, magnetite, perovskite, and analcime. L. J. S.

SCHADLER (Josef). *Scharizerit, ein neues Mineral aus der Drachenhöhle bei Mixnitz in Steiermark.* Anzeiger Akad. Wiss. Wien, Math.-naturw. Kl., 1926, vol. 62 (for 1925), p. 180.

The phosphatic earth in the 'dragon's cave' near Mixnitz, Styria, contains patches of a black asphalt-like nitrogenous hydrocarbon.

Analysis by H. Lieb gave C 35, H 4.5, N 8 (average), P trace, ash 17 %. It is completely soluble in NaOH and reprecipitated by HCl. The material is related to dopplerite and phytocollite, but contains much more nitrogen, and it is of animal rather than vegetable origin.

L. J. S.

TSCHIRCH (A.) & KATO (—). *Plaffeit, das fossile Harz des Flysch von Plaffeien*. Mitt. Naturfor. Gesell. Bern, 1926, for 1925, pp. 13–19.

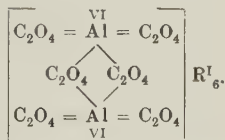
An amber-yellow resin occurs as fragments in nests and bands in the Flysch at Plaffeien, Switzerland. It is very brittle, has melting-point 211° , and differs from all other fossil and recent resins in its chemical characters. Thirteen different resins (m.p. 60° – 284°) were extracted by various solvents, and analyses are given of some of these. L. J. S.

Chemical Constitution of Silicates.

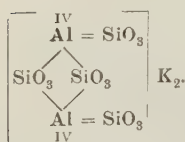
WAHL (W.). *Alumosilikater, nas konstitution, deras bildningsbetingelser och deras omvandling till jordarter*. [Constitution of aluminosilicates, their conditions of formation and their conversion into soils.] Finska Kemistsamfundets Meddelanden, 1927, no. 1 and 2, 40 pp., 18 figs.

WAHL (Walter). *Über die Konstitution der Silikate*. Zeits. Krist., 1927, vol. 66, pp. 33–72, 173–190.

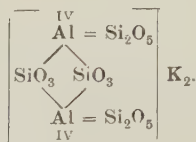
The author has recently proved that certain alkali aluminium trioxalates of the type $\text{Al}_2(\text{C}_2\text{O}_4)_3 \cdot 3\text{R}^1_2\text{C}_2\text{O}_4 \cdot n\text{H}_2\text{O}$, usually regarded as 'double salts', can be split up into optically-active enantiomorphous isomers. It therefore becomes necessary to write a co-ordination formula with a central sexavalent ('co-ordination number' 6) aluminium atom, the six C_2O_4 groups being arranged as at the corners of an octahedron to form the tervalent anion. One of the nine possible types of aluminosilicates is here shown with two aluminium atoms. In some other cases a central quadrivalent aluminium atom forms with four C_2O_4 groups a univalent anion, giving the complex $[\text{C}_2\text{O}_4 = \text{Al}^{\text{IV}} = \text{C}_2\text{O}_4]\text{R}^1$. The aluminosilicates are suggested to be analogous to these aluminosilicates, and formulae on the same lines are given for numerous minerals, a 'silicyl' group SiO_3 or a 'bisilicyl' group Si_2O_5 taking the place of the oxalate groups. Some of the formulae, e.g. for the micas, are written to



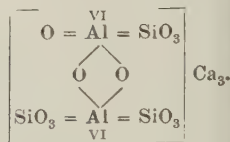
show the polymerization of the molecule and are given as text-figures filling up the larger part of a page. The following few examples may be quoted :



Leucite,
[Al₂(SiO₃)₄]K₂.



Orthoclase,
[Al₂(SiO₃)₂(Si₂O₅)₂]K₂.



Garnet,
[Al₂O₃·SiO₃]₃Ca₃.

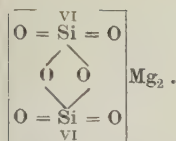
These formulae suggest an explanation for the breaking down of orthoclase into leucite and silica at a high temperature, for the alteration of felspar to kaolin, of garnet to chlorite, &c. The alumino-silicates being all high-temperature compounds, these formulae cannot be tested by the methods of stereo-chemistry as is the case with organic compounds. [The formulae are based on A. Werner's theory of co-ordination, in which the usually accepted views of valency do not hold; and they are essentially different from the co-ordination formulae proposed by J. Jakob (M.A. 1-366) and adopted in P. Niggli's 'Lehrbuch der Mineralogie' (1924-6).]

L. J. S.

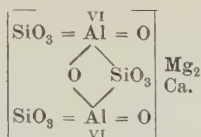
WAHL (Walter). *On the isomorphous replacement of silicon by aluminium.*

Ann. Acad. Sci. Fennicae, Ser. A, 1927, vol. 29, no. 22, 12 pp.

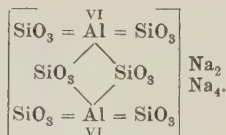
P. A. von Bonsdorff in 1821 concluded that in the pargasite variety of hornblende the aluminium played the part of an acid, replacing silicon rather than calcium and magnesium. That was before the days of the present ideas of valency, which must now be somewhat modified. In fluosilicates the silicon atom is surrounded by six fluorine atoms and the co-ordination formula is [Si^{IV}F₆]^I₂. Replacing the fluorine by oxygen, the compound [Si^{IV}O₃]^I₂, with the same empirical composition as a meta-silicate, is obtained. This is assigned to clinoenstatite, which at a high temperature breaks down into forsterite and silica. A compound similar to this, together with 'syntagmatite' and an addition-product of jadeite, would give molecules with sufficient structural similarity to form isomorphous mixtures, and so explain the presence of aluminium in the amphiboles. Here there is a replacement of silicon atoms with a co-ordination number equal to six by aluminium atoms also with a co-ordination number equal to six.



Clinoenstatite,
[Si₂O₆]Mg₂.



'Syntagmatite' of
Tschermak.



Addition product of
jadeite.

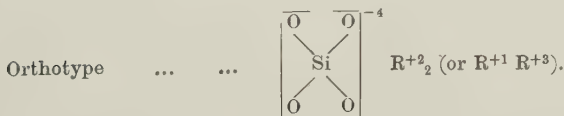
L. J. S.

MACHATSCHKI (Felix). *Zur Frage der Struktur und Konstitution der Feldspate. (Gleichzeitig vorläufige Mitteilung über die Prinzipien des Baues der Silikate.)* Centralblatt Min., Abt. A, 1928, pp. 97-104.

W. Wahl's co-ordination formulae for albite [Al₂(SiO₃)₂(SiO₅)₂]K₂ and anorthite [Al₂O₂(SiO₃)₂]Ca do not explain the isomorphism of this pair of minerals. As the fundamental unit of silicate structures the author takes a tetrahedral group of four O⁻² ions around a Si⁺⁴ ion. Aluminium Al⁺³ with O⁻² may have co-ordination number of 4 or 6, and when 4 it may take the place of silicon in the tetrahedral group of oxygens. Similarly, Be⁺² and perhaps B⁺³ may also occupy this position. Since tetrahedra cannot fill space, the cavities between them may be occupied by the metal ions. In the felspar type of silicate structure (where Si + Al : O = 1 : 2) every oxygen ion is common to two adjacent tetrahedra, and the 'formulae' are written :



In the 'metatype' of metasilicates, with SiO₃ or AlO₃, only two of the oxygen ions are in common for adjacent tetrahedra, while in the 'orthotype' none are in common :



Only in the orthotype do separate molecules exist, the formula being then of the ordinary co-ordination kind; in the felspar type and the

metatype, in which the oxygen ions are common to two or more tetrahedra, the structures are continuous and there are no separate molecules.

L. J. S.

ENDRÉDY (Endre). *Újabb adatok a szilikátok kémijához.*—ENDRÉDY (A.). *Beiträge zur Chemie der Silikate.* Földtani Közlöny, Budapest, 1927, vol. 57, pp. 20-27 (Hung.), pp. 105-112 (Germ.).

Attempts were made to arrive at the chemical constitution of grossular and andradite by their fractional solution. The powdered minerals are dissolved by hydrochloric acid, but the experiments gave no clue as to the constitution. Dilute chromic acid, which attacks many silicates, dissolves 0.5 gram. of andradite in 48 hours, and it is suggested that the solution contains a complex silicochromate anion. By this method the formula of andradite was determined as $3\text{CaO} \cdot \text{Fe}_2\text{O}_3 \cdot 3\text{SiO}_2$. Numerical data are tabulated, and the experiments will be continued. K. Z.

NUTTING (P. G.). *The association of water with serpentine.* Journ. Washington Acad. Sci., 1928, vol. 18, pp. 81-89, 4 figs.

An attempt is made to distinguish between dissolved, adsorbed, and chemically combined water. The weights of a sample of serpentine at temperatures 26° , 36° , and 46°C . are plotted against the humidities of the atmosphere; the curves show greater variations in the more arid and more humid regions. The dehydration (weight-temperature) curve shows no break, but the logarithmic curve shows breaks at 368° (corresponding with $2\text{H}_2\text{O}$) and at 620° (corresponding with $1\frac{1}{4}\text{H}_2\text{O}$).

L. J. S.

GREIG (J. W.). *On liquid immiscibility in the system $\text{FeO}-\text{Fe}_2\text{O}_3-\text{Al}_2\text{O}_3-\text{SiO}_2$.* Amer. Journ. Sci., 1927, ser. 5, vol. 14, pp. 473-484, 5 figs.

The system is closely similar to those of SiO_2 with CaO , &c. [M.A. 3-289]. In $\text{FeO}-\text{SiO}_2$ two liquids exist in contact with cristobalite at 1690°C ., with 3 and 42 % FeO respectively. Increase in Fe_2O_3 lowers the temperature of coexistence to about 1665°C . with 50 % Fe_2O_3 . The solidified phases were separated and analysed. Small amounts of alumina and soda prevent the formation of two liquids. No support is found for the existence of two liquid phases in igneous rocks, but they probably occur in silica furnace-linings.

A. F. H.

Artificial Minerals.

TSCHIRWINSKY (P.) [= CHIRVINSKY (P. N.)]. *Voraussage von Mineralien durch die Mineralsynthese*. Zeits. Krist., 1926, vol. 64, pp. 544-548.

The prediction of minerals by mineral synthesis. A list is given of 163 chemical elements and compounds that had been prepared artificially before they were known as minerals. Amongst these haloids and sulphates predominate. [Schultenite, Min. Mag., 1926, vol. 21, p. 149, is a good example to add to the list.] Amongst 447 'new' minerals listed in Min. Mag., vols. 15-20, silicates and phosphates predominate.

L. J. S.

SCHARIZER (Rudolf). *Beiträge zur Kenntnis der chemischen Konstitution und der Genese der natürlichen Ferrisulfate*. XII. Zeits. Krist., 1927, vol. 65, pp. 1-22, 5 figs. [Cf. M.A. 1-318; 2-156.]

The compound $\text{H}_2\text{K}_{10}[\text{Fe}(\text{OH})_6](\text{SO}_4)_{12} \cdot 15 \text{ aq}$ is dimorphous. The hexagonal α -metavoltine [M.A. 2-156] is the labile form and readily falls to powder. The triclinic β -metavoltine forms minute red-brown crystals and is the stable form. It is deposited on the α -metavoltine owing to changes in the composition of the mother-liquid brought about by the deposition of the salt. The hydrolysis of solutions of metavoltine is further discussed. An aqueous solution of potash-iron-alum ($\text{K}_2\text{Fe}_2(\text{SO}_4)_4 \cdot 24 \text{ aq}$) evaporating at the ordinary temperature deposits crystals of metavoltine, but when the solution has evaporated to dryness there remains a pale-violet salt with the composition $\text{K}_2\text{Fe}_2(\text{SO}_4)_4 \cdot 8 \text{ aq}$, which sometimes forms pseudomorphs after metavoltine. The minute crystals are monoclinic with $a:b:c = 0.9502:1:1.0221$, $\beta = 72^\circ 43'$; sp. gr. 2.403.

L. J. S.

SCHARIZER (Rudolf). *Beiträge zur Kenntnis der chemischen Konstitution und der Genese der natürlichen Ferrisulfate*. XIII. Zeits. Krist., 1927, vol. 65, pp. 335-360, 6 figs.

Werner's co-ordination formulae are given for several ferric sulphates, and dehydration curves for rhomboclase, coquimbite, copiapite, fibro-ferrite, amarantite, castanite, and quenstedtite. The neutral anhydrous salt $\text{Fe}_2(\text{SO}_4)_3$ is orthorhombic with $a:b:c = 0.9857:1:1.3991$. Szomolnokite = ferropallidite ($\text{FeSO}_4 \cdot \text{H}_2\text{O}$) crystallizes as egg-shaped grains which show indications of twinning and are probably monoclinic.

L. J. S.

SEIFERT (H.). *Zwillinge von Periklas*. Centralblatt Min., Abt. A, 1926, pp. 305-307.

Artificial crystals of periclase (MgO) produced in a furnace, evidently from magnesium oxychloride, are skeletal octahedra up to $1\frac{1}{2}$ cm. edge. They are partly altered on the surface to hydroxide and carbonate, and show triangular etch-figures with a series of facets ranging from (61.61.60) to (332) in the pits. Some of the crystals are twinned on the spinel-law with flattening parallel to the twin-plane. In producing the cleavages (100) a plane of separation (110) was obtained. L. J. S.

GAUBERT (P.). *Sur les propriétés optiques de quelques minéraux artificiels*. Compt. Rend. Congrès Soc. Sav., 1926, for 1925, pp. 402-408.

GAUBERT (Paul). *Propriétés optiques de quelques minéraux artificiels*. Bull. Soc. Franç. Min., 1927, vol. 50, pp. 504-515.

Artificial minerals, especially those in isomorphous series, prepared by past workers and preserved in collections, were examined optically. Refractive indices were determined by the immersion method on the microscope heating-stage. Since the refractive indices of liquids vary with the temperature about twenty times as much as in solids, it is possible to get an exact match in the refractive index as the liquid cools. Spinel (MgAl_2O_4) has n 1.722. The 'amorphous sapphires' produced by L. Paris (1908) and thought to be spinel have n 1.67-1.68. Gahnite (ZnAl_2O_4) has n between 1.80 and 1.81. Cr_2O_3 is optically positive (corundum and haematite being negative) with n about 2.6. In the apatite group: for $\text{Ca}_4(\text{PO}_4)_3\text{CaCl}$ ω 1.648, ϵ 1.637, negative; $\text{Sr}_4(\text{PO}_4)_3\text{SrCl}$ ω 1.658, ϵ 1.664, positive. In A. de Schulten's monetite series: for CaHPO_4 α 1.61, γ 1.63 (the values given by E. S. Larsen, 1921, for monetite are really those of gypsum); SrHPO_4 α 1.608, γ 1.625; BaHPO_4 α 1.617, γ 1.635; SrHAsO_4 α 1.635, γ 1.617. For iron-orthoclase α 1.601, γ 1.609. L. J. S.

FREY (A.). *Vergleich des Whewellit mit Mikrokristallen von Calcium-oxalat-Monohydrat*. Schweiz. Min. Petr. Mitt., 1924, vol. 4, pp. 16-23, 5 figs.

FREY (Albert). *Calciumoxalat-Monohydrat und -Trihydrat in der Pflanze. Eine physiologische Studie auf Grund der Phasenlehre*. Vierteljahrsschr. Naturfor. Gesell. Zürich, 1925, vol. 70, pp. 1-65, 18 figs.; Promotionsarbeit Eidgen. Techn. Hochschule Zürich, 1925, no. 385, 65 pp., 18 figs.

The habit of crystals and frequency of forms are compared for whewellite and the microscopic crystals of $\text{CaC}_2\text{O}_4 \cdot \text{H}_2\text{O}$ found in plant

tissues and prepared artificially are compared. The latter show only the forms $e(\bar{1}01)$, $b(010)$, $x(011)$, and $m(110)$, and the predominating form e (also the twin-plane) has often been taken as the basal plane. The correct orientation is that adopted for whewellite ($a:b:c = 0.8696:1:1.3695$, $\beta = 72^\circ 42'$). The trihydrate, $\text{CaC}_2\text{O}_4 \cdot 3\text{H}_2\text{O}$, is metastable and passes into the monohydrate. It is tetragonal, $a:c = 1:0.4118$ with the forms $p(111)$, $m(110)$, $\delta(301)$ and sometimes twinned on $n(201)$; $\epsilon 1.583$, $\omega 1.552$.
L. J. S.

HUME (John) & TOPLEY (Bryan). *The density of calcium carbonate hexahydrate*. Journ. Chem. Soc. London, 1926, pp. 2932-2934.

New determinations of the density of artificial crystals of $\text{CaCO}_3 \cdot 6\text{H}_2\text{O}$ by different methods gave $D^0 1.834$ and 1.817 , appreciably higher than previous determinations [M.A. 3-164].
L. J. S.

LAMBERT (Bertram) & HUME-ROTHERY (William). *Studies of precipitated solids. Part I. Strontium sulphate*. Journ. Chem. Soc. London, 1926, pp. 2637-2648, 2 pls., 2 text-figs.

LAMBERT (Bertram) & SCHAFFER (Robert John). *Studies of precipitated solids. Part II. Calcium sulphate*. Ibid., 1926, pp. 2648-2655, 10 figs.

WEIMARN (Petr P. von). *Studies of precipitated solids, especially of strontium and calcium sulphates*. Ibid., 1927, pp. 929-930.

Numerous experiments were made on the precipitation of strontium sulphate, varying (1) the temperature ($0-100^\circ \text{C.}$), (2) the concentration of the solutions, (3) the cations of the sulphate solution (H^+ , Na^+ , Mg^{++} , Al^{+++}), (4) the anions of the strontium salt solution (Cl^- , NO_3^- , CH_3CO_2^-), (5) the time of exposure of the precipitate to the mother-liquor. Under certain conditions a bulky flocculent precipitate consisting of needles of a new hydrated strontium sulphate were obtained. This soon changed (at 100°C. in 10 seconds) to a powdery precipitate consisting of rhombs of celestine. The faces present on the latter, and the habit of the crystals, vary considerably, and a regular series of changes in form takes place with changes in temperature and concentration of the solution. The time taken for the precipitate to appear varies with the different salts, suggesting an intermediate colloidal form.

A similar series of experiments was made with calcium sulphate. The hexagonal hemihydrate ($\text{CaSO}_4 \cdot \frac{1}{2}\text{H}_2\text{O}$) is formed at temperatures above $75^\circ-96^\circ \text{C.}$, depending on the nature of the solution; and the dihydrate (gypsum) forms below this transition temperature. The usual forms of the gypsum crystals are $(110)(010)(111)$, but using calcium acetate the

forms are (110) (010) with (103) or (203), the last being new for gypsum. Twins on (101) of different types were formed under varying conditions. Other faces developed during growth are (401), (301), (201), (302), and (101). The faces (111) are due to solution. L. J. S.

Growth and Corrosion of Crystals.

WALCOTT (Albert J.). *Some factors influencing crystal habit.* Amer. Min., 1926, vol. 11, pp. 221-239, 259-278.

Numerous experiments were made on the growth of crystals of lead, barium, and strontium nitrates at various temperatures (5-30° C.) and with different rates of growth (controlled by the rate of evaporation of the solution), both from pure aqueous solution and in the presence of various substances (inorganic salts, methylene blue, glycerine, insoluble suspensions, &c.). The crystals obtained were observed under a binocular microscope and the percentage predominance of the different forms noted for each experiment. Crystals grown slowly at a low temperature are simple in form, and they become more complex with increasing temperature. The crystal habit is also influenced by the presence of impurities in the solution, a more complex habit being produced when the impurity is less soluble than the crystallizing salt. It is suggested that the influence of these impurities is more closely connected with their influence on the nature of the solvent than with any adsorption in the crystal. L. J. S.

FISHER (L. W.) & SIMONS (F. L.). *Applications of colloid chemistry to mineralogy. Part I. Preliminary report.* Amer. Min., 1926, vol. 11, pp. 124-130, 4 figs.

— — *Part II. Studies of crystal growth in silica gel.* Ibid., pp. 200-206, 6 figs.

Crystals of lead iodide, mercuric iodide, and calcium carbonate were grown in silica gel, one of the reagents being incorporated in the gel and the other floating on the surface. The growth and forms of the crystals are described in detail. Growth is influenced by concentration and acidity. The yellow and red modifications of mercuric iodide were obtained, and various double salts of lead iodide and acetate. L. J. S.

FISHER (Lloyd W.). *Variations in crystal forms: a study of lead iodide and lead bromide.* Amer. Journ. Sci., 1928, ser. 5, vol. 15, pp. 39-48, 5 figs.

A continuation of previous experiments on the growth of crystals in silica gel (preceding abstract). The crystals of lead iodide or of double

salts showed variations in form according to the reagents used; e.g. lead nitrate or acetate; KI or HI. Similar results were obtained with lead bromide.

L. J. S.

AMINGOFF (G.). *Über Verdampfung von rhombischem Schwefel*. Zeits. Krist., 1927, vol. 65, pp. 632-635, 1 fig.

Four spheres of sulphur from Sicily were cut, polished, and sublimed at a temperature of about 100° C. At intervals the spheres were examined on the goniometer. It was found that plane faces, corresponding to the most important crystal-faces, were formed in the process. This was in accordance with the author's experience of zinc and other substances, with the exception of thymol [M.A. 2-501; 3-332].

H. H.

SANDER (B.). *Vorläufiger Bericht über Ergebnisse im min.-petr. Institut Innsbruck ausgeführter Gefügeanalysen*. Zeits. Krist., 1927, vol. 65, pp. 501-506.

A discussion on the orientation of crystals in mineral aggregates.

L. J. S.

MIERS (Sir Henry A.). *The growth of crystals in supersaturated liquids*. Journ. Inst. Metals, London, 1927, vol. 37 (no. 1 for 1927), pp. 331-350, 3 figs.

A lecture summarizing the author's earlier work (1906-8) on spontaneous crystallization in supersaturated and under-cooled liquids, with mention of later work by other authors, especially with reference to the crystallization of alloys.

L. J. S.

BRANDENBERGER (E.). *Umriss einer Molekulartheorie des Kristallwachstums*. Zeits. Krist., 1926, vol. 66, pp. 120-130.

The author considers the problem of crystal growth first from the static and then from the kinetic point of view. The former concerns itself with the probability of occurrence of a certain crystal form under given conditions. It is deduced that the ratio of the probabilities of any two forms occurring is a function of the temperature and difference of the surface energies. A complete solution even of the statical problem lies outside of the limits of validity of classical thermodynamics. The kinetic treatment of crystal growth is based upon the theory of the Brownian movement but no general solution can be given of the differential equation thus obtained. However, by separating the various factors of crystal growth, static and kinetic, a clearer view of the whole problem is reached.

F. A. B.

KALB (Georg). *Die morphologische Bedeutung der Vizinalfiguren des Quarzes*. Centralblatt Min., Abt. A, 1927, pp. 279-283, 5 figs.

KALB (Georg) & WITTEBORG (Werner). *Die Vizinalfiguren der Rhomboederflächen des β -Quarzes*. Neues Jahrb. Min., Abt. A, 1927, Beil.-Bd. 56, pp. 334-341, 2 pls., 1 text-fig.

The vicinal-faces bounding the triangular pyramids of growth on the rhombohedral faces of ' β -quartz' [i.e. α -, low-temperature quartz] show differences in the directions of the three edges that meet in the apex. Two types are distinguished, both of which are different for the positive and negative rhombohedra and for right- and left-handed quartz. With their aid it is possible to decipher twinned crystals. These figures of growth are well shown by photographic reproductions, with a magnification of 20, on the two plates.

L. J. S.

RINNE (Friedrich). *Kristallographisches zum Kalkbrennen*. Festschrift Victor Goldschmidt, Heidelberg, 1928, pp. 213-220, 1 pl. (figs. 1-3), 6 text-figs.

Cleavage fragments of Iceland-spar when ignited at a dull-red heat become coated with a white crust and show minute (0.1 mm.) 'burn-figures' (similar to etch-figures and dehydration figures) and also a system of fissures. The fragment is then optically anomalous, perhaps due to strain. When completely ignited the fragment preserves its original volume and shape with sharp edges ('topochemical' reaction). A slightly ignited fragment exposed to a moist atmosphere of carbon dioxide shows a secondary growth of calcite in parallel position with the original crystal; but with a thicker crust of calcium oxide this crumbles away, leaving the corroded calcite beneath. Coloured calcites when ignited show more prominently any isomorphous banding. These phenomena are discussed on the basis of the fine structure of calcite.

L. J. S.

Pseudomorphs.

HACQUAERT (Armand L.). *Over pseudomorphosen in radioactieve mineralen van Katanga*.—Some pseudomorphs of uranium-minerals from Katanga. Natuurwetenschappelijk Tijdschrift, Antwerpen, 1927, vol. 9, pp. 34-39. [Flemish, with English summary (p. 39).]

— *Présentation de quelques pseudomorphoses de minéraux uranifères de Kasobu*. Ann. Soc. Géol. Belgique, Publ. Congo Belge, 1927, vol. 50 (for 1926-27), pp. c 15-c 16.

Cubes of uraninite from Luiswishi have been altered into a mixture of gummite and uranophane, with some uraninite remaining in the

middle of the larger (1 cm.) cubes. Pseudomorphous cubes from Kasolo consist of: I, massive orange-coloured curite, which gave on analysis UO_3 74.28, PbO 21.13, Fe_2O_3 0.37, SiO_2 0.14, Te trace, H_2O not determined; II, mixtures of parsonsite, dewindtite (or dumontite) and torbernite; III, sklodowskite; or IV, of uranium hydroxides (ianthinite, schoepite, and becquerelite). The last, containing a small amount of residual uraninite, gave on analysis UO_3 80.38, PbO 8.01, Fe_2O_3 0.91, SiO_2 0.65, Te trace, loss on ignition 10.67 %.

L. J. S.

HACQUAERT (Armand). *Pseudomorphoses de cristaux de calcite en shattuckite-planchéite et en diopase*. Ann. Soc. Géol. Belgique, 1926, vol. 49, Bull. pp. B 90-B 94.

Scalenohedra (2131) of calcite from Tantara mine, Katanga, are completely changed to diopase or to a mixture of deep-blue pleochroic shattuckite and pale-blue non-pleochroic plancheite. Analysis of the latter material gave SiO_2 38.65, CuO 53.53, Al_2O_3 0.75, Co_3O_4 0.20, CaO 0.04, H_2O 5.42, CO_2 0.90 = 99.49; sp. gr. 3.60.

L. J. S.

BAREN (J. VAN). *Bijdrage tot de kennis van pseudo-gaylussiet.—Beitrag zur Kenntnis des Pseudogaylussit*. Mededeelingen van het Geologisch Instituut der Landbouwhoogeschool, Wageningen (Holland), 1926, no. 10, 25 pp., 5 pls. (Dutch, with Germ. résumé, pp. 23-24).

Objects embedded in clay dug from a ditch near Avenhorn, bordering on the Zuider-Zee in North Holland, are compared with pseudogaylussite; and a detailed review is given of the literature on pseudogaylussite. They are more or less porous in the interior consisting of an aggregate of calcite rhombohedra with grains of glauconite, epidote, quartz, and iron sulphide and diatoms; the exterior is harder. Analysis shows CaCO_3 93.25 %. The form is variable, ranging from small points to pseudo-rhombic and pseudo-tetragonal forms. It is concluded that these bodies are not pseudomorphs, but are of concretionary origin.

L. J. S.

TSCHIRWINSKY (P. N.) [= CHIRVINSKY (P. N.)]. *Pseudomorphosen von Limonit nach Markasit von eigenartiger Gestalt (Kernpseudomorphosen der Konkretionen)*. Zeits. Krist., 1927, vol. 65, p. 308, 1 pl.

Small spindle- or conical-shaped bodies, found in the sands of the Don river near the village Kasanskaya, represent the inner portions of marcasite concretions (derived from the Chalk) altered to limonite ('nucleus pseudomorphs'). Sp. gr. 3.757.

L. J. S.

LINCK (G.). *Cölestin pseudomorph nach Faser gypsums nebst einem Anhang über Tutenmergel*. *Chemie der Erde*, 1926, vol. 2, pp. 481-488, 5 figs.

The thin seams of fibrous celestine in the Muschelkalk near Jena were described by O. Mügge in 1899, and he suggested that the material was pseudomorphous after gypsum. This is now proved to be the case by specimens showing gypsum passing into celestine. This is discussed in connexion with 'cone-in-cone' structure. L. J. S.

SHANNON (Earl V.). *Sericite-lazulite pseudomorphs after orthoclase from Bolivia*. *Journ. Washington Acad. Sci.*, 1927, vol. 17, pp. 388-390.

Carlsbad-twins of orthoclase, occurring as phenocrysts in a much altered quartz-porphry collected by F. A. Canfield in 1886, in the Real Socavon, Potosi, are turquoise-blue in colour and consist of a very fine grained mixture of sericite and lazulite (optically negative, $2V$ very small, β 1.654), in which are embedded minute well-developed crystals of mispickel, pyrite, and quartz. L. J. S.

RETTGER (R. E.). *Replacement of calcite by gypsum*. *Amer. Min.*, 1924, vol. 9, p. 153.

Fossils shells of Tertiary age from Peru show an almost complete replacement of calcite by gypsum. A layer of limonite was deposited on the shells apparently before this replacement. L. J. S.

Clays.

CALSOW (G.). *Über das Verhältnis zwischen Kaolinen und Tonen*. *Chemie der Erde*, 1926, vol. 2, pp. 415-441, 9 figs.

LINCK (G.) & CALSOW (G.). *Betrachtungen zur Arbeit von G. Calsow über das Verhältnis zwischen Kaolinen und Tonen*. *Ibid.*, pp. 442-445.

Partial analyses are given of eight samples of kaolin, montmorillonite, and other clays from various localities. These materials were heated in vacuo (4 mm. pressure) and curves plot the loss of water against the temperature. Kaolin loses the bulk of its water between 400° and 450° C. From the amount of water lost between these limits by other clays the percentage of crystalline kaolin they contain is calculated, the remainder being assumed to be amorphous clay material. For such mixtures the name kaolinite is reserved as a rock name (analogous to amphibolite, peridotite, &c). L. J. S.

BOEGE (Hermann). *Über den Kaoliningehalt von Tonen*. Chemie der Erde, 1927, vol. 3, pp. 341–369, 10 figs. Reprints as Inaug.-Diss. Jena, 1927.

LINCK (G.). *Ueber den mineralogischen Bestand der Tone*. Ibid., pp. 370–374.

Chemical analyses are given of eight clays from German localities. Digesting the material in hydrochloric acid (*d* 1.1) for two hours from 6.00 to 14.08 % $\text{Al}_2\text{O}_3 + \text{Fe}_2\text{O}_3$ went into solution; this representing the colloidal portion of the aluminium silicate. After ignition of the material at 700° hydrochloric acid extracted more (up to 36.82 %) alumina; the additional amount representing the broken-down kaolin. From these results the amount of kaolin in the clay can be calculated. Estimation of the amount of kaolin present in each of these clays was also made by the dehydration method of G. Calsow [preceding abstract]. L. J. S.

KÖLBL (L.). *Vorkommen und Entstehung des Kaolins im niederösterreichischen Waldviertel*. Tschermaks Min. Petr. Mitt., 1927, vol. 37 (for 1926), pp. 173–200, 5 figs.

Deposits of kaolin have long been worked in the crystalline schists of the Lower Austrian Waldviertel. They occur along crevices, and it is concluded that they have been formed in situ by weathering beneath a covering of peat (bands of lignite occur in the associated beds of Tertiary age). Analyses are given of the fresh rock (granulite) and of the portions soluble in strong HCl and in H_2SO_4 of the weathered rock, of the completely weathered sandy debris, and of the clay nodules. In the fresh rock $\text{SiO}_2 : \text{Al}_2\text{O}_3 : \text{bases} = 8.15 : 1 : 1.12$, and in the HCl extracts of the weathered products $\text{SiO}_2 : \text{Al}_2\text{O}_3 : \text{bases}$ approximates to $2 : 1 : 0$, suggesting kaolin. L. J. S.

ALLEN (Victor T.). *Anauxite from the Ione formation of California*. Amer. Min., 1928, vol. 13, pp. 145–152, 1 fig.

This mineral, recently mentioned under the name 'ionite' [M.A. 3–370], is of widespread occurrence as pearly scales in the sandstones and clays of the Ione formation. It is now identified with anauxite. It was analysed by W. F. Hillebrand in 1889, and three new analyses are given of material from Amador County; these show SiO_2 52.46–55.88, Al_2O_3 30.24–32.20, Fe_2O_3 0.58–1.69, MgO to 0.41, CaO trace to 0.30, Na_2O to 0.34, K_2O to 0.42, H_2O 12.13–13.48 %. The formula is deduced as $2\text{Al}_2\text{O}_3.6\text{SiO}_2.5\text{H}_2\text{O}$. The flakes are usually irregular, but a few show hexagonal outlines. α 1.559, β 1.564, γ 1.564, $2V$ $18-32^\circ$, negative;

extinction usually parallel to the perfect basal cleavage, but may be up to 4° . Tracing the Ione sandstone eastwards chlorite comes in, and at times the chlorite and anauxite are in parallel growth in the same flake. The anauxite has evidently been derived from the chlorite, which itself was derived from biotite, as a result of surface weathering. Alterations of this kind are noted from other districts. L. J. S.

ROSS (Clarence S.) & FOSHAG (William F.). *Anauxite, a mineral species, based on material from Bilin, Czechoslovakia.* Amer. Min., 1928, vol. 13, pp. 153-155.

Anauxite appears to be a widely distributed clay mineral. Material separated from the altered basalt of Bilin [M.A. 2-306] gave analysis I for that derived from augite and II for that derived from biotite, agreeing with the formula $\text{Al}_2\text{O}_3 \cdot 3\text{SiO}_2 \cdot 2\text{H}_2\text{O}$.

	SiO_2 .	Al_2O_3 .	Fe_2O_3 .	MgO .	CaO .	Na_2O .	$\text{H}_2\text{O}-$.	$\text{H}_2\text{O}+$.	Total.
I.	54.32	29.96	2.00	0.14	0.32	0.37	0.84	11.80	99.75
II.	53.80	32.48	1.12	0.26	0.34	—	0.94	10.98	99.92

The flakes are monoclinic with nearly hexagonal outline and perfect basal cleavage. a 1.559, β 1.564, γ 1.565, $2V$ $30-42^\circ$, negative; $a = c$, $\beta = a$, $\gamma = b$; extinction on (010) up to $1\frac{1}{2}^\circ$. L. J. S.

Economic Minerals and Ore-deposits.

KEEP (F. E.). *Observations on the Shabani chrysotile-asbestos deposits.* South African Journ. Sci., 1927, vol. 24, pp. 146-154, 4 figs.

The Shabani area, in the district of Belingwe, produces most of the chrysotile-asbestos of Rhodesia. The deposits occur in a mass of serpentine about ten miles long and from one to three miles wide, which is completely surrounded by younger granite, from which the serpentine is separated by a selvage of talc-carbonate rocks. The zone of fibre-bearing serpentine is in the centre of the mass; it extends for at least three miles, with a width of two hundred yards, and it has been proved to a depth of six hundred feet. The seams of chrysotile may be as much as six inches wide, but owing to the presence of partings, the fibre is seldom longer than three inches. The proportion of fibre to rock is locally as much as 20 %. The microscope shows the fibre-bearing serpentine to be an altered dunite, in which unchanged crystals of olivine have sometimes been preserved. No commercial fibre is found in serpentine formed from any other kind of rock. The author gives reasons for believing that the conversion of the dunite into serpentine was effected by

deep magmatic water. Veins of magnesite, hydromagnesite, and opal are commonly found in the serpentine wherever chrysotile is absent.

S. J. S.

HALL (A. L.). *On the talc deposits near Kaapmuiden, in the eastern Transvaal*. Trans. Geol. Soc. South Africa, 1928, vol. 30 (for 1927), pp. 69-88, 2 pls., 3 text-figs.

Records a new deposit of talc in commercial quantities in the Jamestown series of basic igneous rocks. Both pure green foliated talc and massive grey steatite are found. The main talc reef has an extreme width of twenty feet; it occurs within decomposed serpentine traversed by veins of magnesite. In the talc there are oval nests of crystalline dolomite. Analyses of talc and dolomite are furnished, as well as a full account of the preparation of the mineral for the market, a discussion of the probable reserves, and the prospects of the industry. While thermal metamorphism by the Older Granite may have assisted in the formation of the talc, it is believed that hydration and carbonation in the zone of weathering played a more important part.

S. J. S.

KUPFERBURGER (W.). *The fluorspar, lead and zinc deposits of the western Transvaal*. Trans. Geol. Soc. South Africa, 1928, vol. 30 (for 1927), pp. 5-56, 6 figs.

In the Marice district of the Transvaal, lead and zinc minerals and fluorspar occur in veins, pipes, and irregular replacement deposits in the Dolomite formation. Two large bodies of nearly pure fluorspar have yielded over 40,000 tons of the mineral, which is mostly white or pale in colour and so pure that it can be marketed after hand-sorting; it yields over 98 % of CaF_2 . These deposits which have been opened up to some depth reveal a floor of brecciated dolomite, indicating that the mineralizing solutions rose along lines of brecciation, faults, and joint-planes. The most important occurrence of blende is in a pipe-like body which has a core of brecciated dolomite around which there is a peripheral zone of blende several feet wide. Galena is found in irregular veins and replacements in dolomite, but most of the ore has been obtained by a process of 'grubbing for galena in soft, loose manganese earth', about the junction of the dolomite with the overlying Pretoria beds. Minerals associated with the galena are cerussite, anglesite, hemimorphite, pyromorphite, vanadinite, minium, and massicot.

S. J. S.

KEEP (F. E.). *The barytes deposits in the vicinity of Gado siding, Gwelo district.* Southern Rhodesia Geol. Survey, Short Report no. 22, 1927, 7 pp., 1 fig.

Deposits of very pure barytes occur as lenses in felsitic schists which are altered lavas. The lenses lie parallel to the foliation of the felsites, and dip at high angles. Associated minerals are quartz, galena, and a little pyrite. It is estimated that at least 100,000 tons of high grade barytes exist within a depth of fifteen feet from the outcrops. S. J. S.

REINECKE (Leopold). *The location of payable ore-bodies in the gold-bearing reefs of the Witwatersrand.* Trans. Geol. Soc. South Africa, 1928, vol. 30 (for 1927), pp. 89-119, 3 pls., 5 text-figs.

An account of the stratigraphy of the Witwatersrand system and the mineralogy of the reefs is followed by a discussion of the main tectonic features. The existence of a fault with a horizontal shift of 750 feet is recorded in the Crown mines. The concentration of the gold in elongated strips of reef, or pay-streaks, is the main subject of discussion. No connexion could be traced between the fluctuations of the gold content and the variations in the proportions of secondary minerals in the reefs, nor are these fluctuations related to the presence of faults, folds, or dikes. On the other hand, it is found that the average diameter of the larger pebbles is almost always greater in rich reef than in poor reef, and the rounding and grading of the pebbles are more complete in rich reef. A discussion of the origin of the gold gives renewed support to the now well-established placer theory, but the beds are considered to have been deposited on a river flood-plain rather than on the sea-floor or in a delta.

S. J. S.

WAGNER (Percy A.). *The iron deposits of the Union of South Africa.* Mem. Geol. Survey South Africa, 1928, no. 26, 264 pp., 45 pls. and maps, 30 text-figs. Price 10s.

The introduction gives the history of iron mining in the Union, from its prehistoric beginnings up to the formulation, by the present government, of a Bill to constitute a South African Iron and Steel Corporation. A classification of the deposits occupies chapter 1. In chapter 2 the enormous segregations of titaniferous magnetite in the Bushveld complex are discussed, and in chapter 3 similar deposits in the Tugela valley, Natal. The contact-metasomatic haematite deposits at Kromdraai, north

of Pretoria, are dealt with in chapter 4. They are believed to have been formed by the action of iron-bearing emanations, possibly ferric fluoride, from the Bushveld granite on its roof of tuffs and agglomerates. Lode deposits of igneous origin are discussed in chapter 5; they are of little importance. The ores of sedimentary origin include the banded ironstones of the Swaziland system, which have an enormous areal development (chapter 6), and the very important oolitic ores of the Transvaal system (chapter 7). Ore of workable grade occurs on five distinct horizons in the Pretoria series. The magnetite-quartzite of the Timeball Hill zone is said to be 'without doubt one of the greatest iron deposits of the world, if not the greatest'. Chapter 8 discusses the bedded ores of the Waterberg system, and chapter 9 the important sideritic ores of the Karroo system. Replacement deposits and secondary concentrations formed by leaching of the banded ironstones are considered in chapters 10-12. These ores are especially rich and free from undesirable impurities. Superficial and miscellaneous deposits occupy two short chapters, and tables of ore reserves complete this most important memoir.

S. J. S.

BARVÍŘ (Jindřich Ladislav). *Ze zlatých hor jílovských*. [From the gold mines of Jílové.] Prague (privately printed), 1927, 120 pp., 13 figs. and maps.

The petrogenetic and metallogenetic features of the ancient gold mining district of Jílové have been studied in detail by the author during the past thirty-five years, and his results have been published in a series of papers, mostly in 1901-3. These results, which are of fundamental importance for the genetic interpretation of the metalliferous deposits and may be of practical help in prospecting, are summarized in the present book. Many historical documents dating back from medieval times are quoted, and views are expressed as to the future prospects of mining in the district. Of special mineralogical interest is a report (p. 50) of experiments on the precipitation of gold from a solution of gold chloride on pyrite with associated chlorite. In the dark, precipitation began in 24 hours and was complete in 48 hours; more gold was deposited on the chlorite than on the pyrite. Tetradymite (pp. 53-55) is noted from Bohuliby, south-west of Jílové, and it is pointed out that late in the sixteenth century tellurium minerals in the Jílové district were known to Lazarus Ercker under the names 'Gold-rahm' and 'Eisenmann'.

F. S.

Lőw (Márton). *Ércelőfordulások a Mátrában*.—Lőw (M.). *Erzlagertstätten in der Máttra (Komitat Heves, Ungara)*. Földtani Közlöny, Budapest, 1926, vol. 55 (for 1925), pp. 127–143 (Hung.), pp. 319–323 (Germ.), 5 figs.

This paper is a comprehensive study of the ore-deposits of the Mátra Mts., in Hungary. They belong to three groups. (1) In the mounts Lahocza, Fehérkő, Veresvár, and Hegyestető, the central point being Mátrabánya on the south side of Mt. Lahocza near Recsk. The country-rock is biotite-hornblende-andesite, which is much fractured and silicified. The ores occur in flat beds (not lodes), and consist of native copper and black copper oxide with tetrahedrite and chalcopyrite below and enargite at the bottom. Pyrite is present throughout, but galena and blende are absent. (2) In the second group, north of Gyöngyösoroszi, the ores occur in lodes and consist of tetrahedrite, chalcopyrite, and pyrite, with much galena and blende which carry gold and silver. (3) The lodes at Bájpaták are in diorite and carry native copper, malachite, chersylite, calcite, and laumontite.

K. Z.

Годовой обзор минеральных ресурсов С.С.С.Р. за 1925/26 г.—*Annual report on the mineral resources of the U.S.S.R. during the fiscal year 1925/26*. Leningrad (Geological Committee), 1927, vol. 1, 804 pp.

A series of articles by several authors on the metals and various non-metallic minerals of economic importance. The title-page, editorial note, contents, summary, and index are given in English as well as in Russian. The headings of the numerous statistical tables are in many cases also given in English. The volume is a first attempt on the lines of the American publications 'Mineral Resources of the United States' and 'The Mineral Industry'.

P. N. C.

[SHADLUN (N. A.)] Шадлун (Н. А.). Никкель. [*Nickel*.] Комиссия по изучению естественных производительных сил России, Росс. Акад. Наук [Commission for the study of the natural products of Russia, Russ. Acad. Sci.], Petrograd, 1923, vol. 4, no. 5, 7 pp.

Of the several deposits of nickel ore in the Urals special reference is made to that in the Novo-Cheremshansky mine in the Verkhne-Ufalei estate. Here the usual clayey nickel ores occur in polianite, chalybite, limonite, and lignite. The last contains carbon 42% and ash 6–7%, the ash with Ni 3–15%, CaSO_4 40%, &c. This type of nickel ore is named 'kerzinite'. The several varieties of hydrated nickel silicates show a wide range in colour—yellow, green, red, brown. The nickeliferous polianite ore (Ni 4–7%) has been derived from serpentine, which as

dunite was intruded as veins in marble, and richer ore (Ni 12-15 %) lies in contact with the marble. These ores have a wide distribution and are available in large amounts.

P. N. C.

GERRIE (William). *Molybdenite in LaCorne and Malartic townships, Quebec*. Univ. Toronto Studies, Geol. Ser., 1927, no. 24, pp. 37-40, 3 pls., 3 figs.

Molybdenite is found in the Temiskaming district in pegmatite veins in biotite-schist near granite. The pegmatite is rich in quartz (90 %) and is of the quartz-felspar or quartz-mica type. The molybdenite occurs mostly in the felspar or mica and is segregated along the borders of the veins.

L. J. S.

HANSON (George). *Zoning of mineral deposits in British Columbia*.

Trans. Roy. Soc. Canada, 1927, ser. 3, vol. 21, sect. IV, pp. 119-126.

The known mineral deposits in British Columbia were plotted on a map (not reproduced in the paper) to show their relation to the intruded masses of igneous rocks. In the mineralized areas the general succession is tungsten, gold, copper, zinc, lead and silver, as one proceeds away from the igneous rock.

L. J. S.

Salt. The mineral industry of the British Empire and foreign countries.

Imperial Institute, London (H.M. Stationery Office), 1927, 123 pp.

[Price 2s.

Bromine. Ibid., 1928, 19 pp. Price 6d.

Iodine. Ibid., 1928, 21 pp. Price 6d.

Diatomaceous earth. Ibid., 1928, 55 pp. Price 1s.

These pamphlets form a continuation of the set issued by the former Imperial Mineral Resources Bureau [M.A. 1-85], and the series now extends to fifty numbers covering a wide range of economic minerals and products. General information is given as to the nature, modes of occurrence, and uses of each, and more detailed information as to the production and resources in various countries. Many of the earlier issued pamphlets have been supplemented by two further sets giving statistics for each product for the periods 1919-21 and 1920-22.

L. J. S.

Rock-forming Minerals and Petrology.

WALKER (T. L.) & PARSONS (A. L.). *A re-examination of bytownite and huronite*. Univ. Toronto Studies, Geol. Ser., 1927, no. 24, pp. 5-11, 1 pl.

A portion of the original bytownite of T. Thomson, 1836, was obtained from his collection, now in Melbourne, Australia. It had been collected

from a boulder at Bytown (now Ottawa) in Canada. Thomson's analysis and classification of the mineral were incorrect, and Tschermak's definition of bytownite in the plagioclase series was based on an analysis by T. S. Hunt in 1851 ($\text{Ab}_{25}\text{An}_{75}$). The material has the appearance of a crushed and granulated anorthosite. After separating calcite and magnetite, four new analyses by H. C. Rickaby are given of different fractions of sp. gr. 2.681–2.709. These agree closely. The fraction with sp. gr. 2.690, α 1.555, β 1.560, γ 1.564, extinction-angle on (001) 13° , gave SiO_2 54.80, Al_2O_3 28.36, Fe_2O_3 0.89, MgO 0.40, CaO 10.35, Na_2O 4.90, K_2O 1.02, total 100.72. This analysis corresponds with $(\text{Ab} + \text{Or})_{48}\text{An}_{52}$, and the optical data with $\text{Ab}_{45}\text{An}_{55}$. Huronite of T. Thomson, 1836, was collected from a boulder near Lake Huron; it is very similar to the huronite from Gowganda, Ontario [M.A. 2-238]. The results of a new analysis are expressed as a mixture of muscovite (about 75 %), zoisite, albite, calcite, and magnetite. L. J. S.

BEDER (Roberto). *Sobre una andesina procedente de Alta Gracia (provincia de Córdoba)*. Bol. Acad. Nac. Cienc. Argentina, 1927, vol. 30, pp. 1–15, 2 pls.

Crystals (1–16 mm.) of andesine project from the surface of andesine-augite into crystalline limestone at the contact. Associated are crystals of tremolite-actinolite and rarely diopside. The andesine crystals show the forms $c b a m M p o e n x f z r y u y \gamma \delta$ [Dana's letters] and $(\bar{1}02)$, and measurements gave $a:b:c = 0.6355:1:0.5519$, $\alpha = 93^\circ 32'$, $\beta = 116^\circ 22'$, $\gamma = 89^\circ 46'$, $cb = 86^\circ 10'$, $ab = 88^\circ 30'$. Extinction-angle on (010) -9.8° , on (001) -1.7° , 2V $74-87^\circ$. Sp. gr. 2.666. Analysis by E. Kittl gave SiO_2 56.77, Al_2O_3 26.60, Fe_2O_3 0.36, CaO 7.56, MgO nil, Na_2O 7.72, K_2O 0.54, H_2O 0.36, CO_2 0.14 = 100.05. Deducting calcite, &c., this corresponds to Ab 54, An 36, Or 3, Cg 7 %.

L. J. S.

KÔZU (Shukusuké) & YOSHIKI (Bumpei). *The dissociation-temperature of brown hornblende and its rapid expansion at this temperature*. Sci. Rep. Tôhoku Univ., Ser. 3, 1927, vol. 3, pp. 107–117, 1 pl., 2 text-figs.

Loose crystals of basaltic hornblende, formerly phenocrysts in hornblende-andesites, were heated in nitrogen under a pressure of one atmosphere. The dissociation-temperature was found to be between 1040° and 1100° C., and at this temperature experiments with a differential dilatometer under the same conditions showed that considerable expansion took place in the direction of the crystallographic c -axis.

Hornblende-augite-andesite, containing abundant microscopic phenocrysts of hornblende, heated in nitrogen confirmed these results, and showed that the considerable expansion of the hornblende crystals at the dissociation-temperature took place with some force especially in the direction of the *c*-axis. The hornblende-bearing 'ball' xenoliths found in some recent lava flows are discussed and it is concluded that the temperature of the enclosing lava is probably lower than 1050° C., and that the hornblende-andesite compared with pyroxene-andesite must be formed under more limited conditions.

F. A. B.

KÔZU (Shukusuké), YOSHIKI (Bumpei), & KANI (Kôichi). *Note on the study of the transformation of common hornblende into basaltic hornblende at 750° C.* Sci. Rep. Tôhoku Univ., Ser. 3, 1927, vol. 3, pp. 143-159, 8 figs.

Several varieties of common hornblende and basaltic hornblende crystals were heated in an atmosphere of nitrogen to temperatures ranging from 200° to 1000° C. In the neighbourhood of 750° C., the common varieties showed a sudden increase of refractive index and birefringence, whilst the extinction-angle (*c*: γ') measured on (110) decreased almost to zero. The resulting product could not be distinguished from basaltic hornblende and varieties of the latter subjected to the same heat treatment in nitrogen showed no change in optical properties. A marked volume contraction on heating in nitrogen also took place at 750° C., which was not observed with basaltic hornblende (preceding abstract). Experiments on the change of weight in air at atmospheric pressures during heating revealed a discontinuity for the common hornblendes at 750° C., and also showed that for both types there was no increase in weight between 25° and 1000° C. This indicates the importance of reduction processes in dissociation at high temperatures. The authors conclude that basaltic hornblende may be defined as a high-temperature modification of common hornblende. The differences between the two may be due to the quantitative and structural changes in the main components and are not only to be referred to the relative amounts of special constituents, such as iron and titanium oxides, or water content.

F. A. B.

CAMPBELL (Robert) & LUNN (James W.). *The tholeiites and dolerites of the Dalmahoy syncline.* Trans. Roy. Soc. Edinburgh, 1927, vol. 55, pp. 489-505, 2 pls., 1 text-fig.

The intrusions described belong to a very early stage of the Carboniferous. The Ravelrig-Dalmahoy-Kaimes sill is built up of successive

injections of very similar material, giving rise to tachylyte, basalt, tholeiite with schlieren of coarser grain and segregation veins, and dolerites. The chemical analyses show close affinities between these rocks and mugearitic lavas. Orthoclase appears along with albite-oligoclase or oligoclase in the groundmass of the holocrystalline parts of the intrusion. The tholeiites consist of basic andesine 46-48, augite 12-15, iron oxides 6-7 %, an iron-rich olivine, fayalite, almost completely replaced by chlorophaeite [Min. Mag., 20-435], and about 30 % of glassy or devitrified glassy groundmass, with abundant patches of chlorophaeite occupying usually a central position in the glassy mesostasis. Small patches of quartz occur occasionally. Chlorophaeite is regarded as a primary constituent comparable in its mode of occurrence to analcime in the teschenites. Small amounts of brown hornblende are observed and are shown to be of late development. The olivine in these rocks has birefringence 0.048-0.049, β 1.77, and 2V fairly large. It is described as fayalite. The intrusions of Auchinoon and Camilty are dolerites with albitized feldspars. These rocks have chemical affinities with the Lochend sill which is regarded as nearly related to the essexites.

W. C. S.

RICHEY (James Ernest). *The structural relations of the Mourne granites (Northern Ireland)*. Quart. Journ. Geol. Soc. London, 1928, vol. 83 (for 1927), pp. 653-688, 3 pls., 7 text-figs.

Four different varieties of the granite forming the Mourne Mountains, Co. Down, are distinguished and are designated as the felspathic variety, quartzose variety, aplitic variety, and pink variety. The first three varieties form the eastern Mournes. They are arranged one within the other and appear to have been intruded successively, the outermost being the youngest. The eastern mass of the outermost granite is exactly comparable to a ring dike and evidence is given in support of the hypothesis that the space now occupied by these granites was provided by successive sinkings of a block of country-rock. The pink variety, of which a new analysis is given, forms an intrusion distinct from and probably newer than the other granites. It forms the main mass of the western Mournes. The drusy cavities often rich in well crystallized minerals occur most abundantly in the neighbourhood of the granite margins; for example, the well-known Diamond Rocks are close to the margin of the quartzose granite. New records of minerals are tourmaline, pale yellow fluorite, a green vermiculite, haematite, and kaolinite.

W. C. S.

GUNNING (H. C.). *Syenite porphyry of Boischatel township, Quebec.*
Bull. Geol. Survey Canada, 1927, no. 46 (Geol. Ser. 47), pp. 31-41, 1 pl.

A stock-like intrusion cuts Keewatin rocks and the 'Older Gabbro' and is itself cut by a dike of 'Later Gabbro' of the region. The rock varies from nordmarkite-porphyry, with up to 60 % of augite, through quartz-syenite-porphyries to alkali-syenites. The various phases exhibit intrusive contacts. Evidence of differentiation after intrusion is not found. The minerals of the groundmass consist largely of albite with some orthoclase and small amounts of quartz. The ferromagnesian minerals in the more basic varieties are augite; aegirine-augite and brown biotite occur in a syenite-porphyry; one of the intermediate types, with 75 % feldspar, contains aegirine and a green amphibole allied to katophorite. A blue amphibole is frequent in the acid types, which contain phenocrysts of quartz in addition to the usual potash-feldspar. Minute grains of sodic feldspar occur both in the potash-feldspar phenocrysts and in the quartz. In the latter they are arranged concentrically parallel to the hexagonal outline. The alteration of the potash-feldspars and the frequent production of a blue amphibole in the acid varieties, and as a product of alteration of the ferromagnesian minerals in the intermediate types, suggest that the whole mass has been acted upon after solidification by volatile constituents which were exceptionally rich in sodium. Optical data for the pyroxenes and amphiboles are given.

W. C. S.

NYSTRÖM (E. T.). *Some alkaline rocks of Shansi province, N. China.*
Bull. Geol. Inst. Upsala, 1927, vol. 22, pp. 59-160, 2 pls. (maps), 53 text-figs.

Three areas of alkaline rocks are described, the Chiao Ch'eng, P'ing Yang, and Tzu Chin Shan intrusives. The last was the subject of a preliminary note by E. Norin [M.A. 2-229]. The age of the intrusions is given as approximately mid-Tertiary. They occur within the central zone of the province but are all near or within the area where the fault-lines of this central zone meet the principal trend-lines of the folded mountainous zones to the north and to the south. In all three areas the parent rock is of åkeritic composition. Differentiation has given rise to granitic, dioritic, and syenitic derivatives. In Tzu Chin Shan only the syenitic derivatives are represented, and the rocks described are: åkerite-porphyry, augite-syenite, nepheline-aegirine-syenite with a swarm of dikes of tinguaitite (some with phenocrysts of pseudo-leucite), leucite-

syenite-porphry, and syenite-pegmatites. In Chiao Ch'eng the granitic derivatives of the åkerite are represented by nordmarkite-porphry, and the syenitic derivatives by augite-syenite, nosean- and melanite-bearing aegirine-augite-syenite and the corresponding porphyries. In the P'ing Yang area the syenitic derivatives are represented only by the analcimized aegirine-augite-syenite-porphry from Liang Chia Po. On the other hand, the differentiation of the Lung Wang Miao åkerite has given rise to a whole series of granitic derivatives: nordmarkite, alkali-granite-aplite, and quartz-porphry, while the splitting-off of a dioritic differentiate has produced a banatite-porphry presenting affinity to the ore-bearing diorites of central and northern China. The very interesting discussion of the differentiation of these rocks is based on complete descriptions of the rocks and of their field relations. Six new chemical analyses are given, and three are quoted from the recent paper by Washington and Keyes [M.A. 3-202].

W. C. S.

[ЛОДОСНИКОВ (V. N.)] Лодосников (В. Н.). Особенности случая двойникообразования в фенокристе лабрадора.—ЛОДОСНИКОВ (V.). *Un cas singulier de formation de macle dans un phénocrystal du labrador*. Изв. Геол. Комит. (Bull. Comité Géol.) Leningrad, 1925, vol. 38 (for 1919), pp. 563-572, 3 pls.

Porphyritic labradorite in basalt from Tarbagatai in Siberia measured on the Fedorov stage gave two new twin-laws for plagioclase. Individuals I and II are twinned on the face e (021); II and III on (231).

P. N. C.

[GERASIMOV (A. P.)] Герасимов (А. П.). Кварцевый двойник в альбитите с р. Мышта.—GUÉBASIMOV (A.). *Sur la macle du quartz dans l'albitite de la riv. Mouchtâ*. Изв. Геол. Комит. (Bull. Comité Géol.) Leningrad, 1925, vol. 38 (for 1919), pp. 561-562.

A quartz grain from a small druse with chlorite measured on the Fedorov stage gave the angle $\rho = 87^\circ$ for the twin-plane, corresponding with X (16.0.16.1), Ω (17.0.17.1), or Y (18.0.18.1).

P. N. C.

VENDL (Mária). *A tarpai Nagyhegy hiperszténandezitje*.—VENDL (Marie). *Über den Hypersthenandesit des Nagyhegy von Tarpa*. Ann. Hist.-Nat. Musei Nationalis Hungarici, 1926, vol. 23, pp. 169-173 (Hung.), pp. 173-177 (Germ.).

Nagyhegy in com. Bereg is a hill 161 m. high rising from the plain. The rock is a light-coloured pyroxene-andesite with porphyritic plagioclase and hypersthene. Hypersthene is present as well-formed crystals,

with pleochroism α brownish-yellow, β yellow, γ light green. In the groundmass, consisting of plagioclase, apatite, and magnetite, there are small cavities with minute tabular crystals of tridymite and prismatic crystals of amphibole. A chemical analysis of the rock is given. The silica percentage (65.32) is higher than in other Hungarian pyroxene-andesites, and is near that of some hypersthene-andesites of the Sierra Nevada in California. K. Z.

PÁLFY (Móric). *Adatok a Tokaji hegység harmadkori eruptióinak korviszonyához.*—PÁLFY (M.). *Beiträge zur Reihenfolge der tertiären Eruptivgesteine des Tokajer Gebirges.* *Földtani Közlöny*, 1927, vol. 57, pp. 67–71 (Hung.), pp. 149–152 (Germ.), 1 fig.

A short preliminary note on the geological succession of the Tertiary andesitic rocks in the Tokaj Mts. (com. Zemplén). K. Z.

LENGYEL (Endre).—*Adatok a zónás plagioklászok ismeretéhez. I. A zónásság és a kristályalak.*—LENGYEL (E.). *Daten zur Kenntnis der zonaren Plagioklase. I. Über die Zonarstruktur und die Kristallform.* *Földtani Közlöny*, 1927, vol. 57, pp. 3–12 (Hung.), pp. 95–102 (Germ.), 2 figs.

A detailed study was made of zoned crystals of plagioclase in the andesites of the Sz. Endre–Visegrád Mts. (com. Pest). Sections that are approximately perpendicular to the crystallographic axes are the most suitable for observation. Note was made of the crystal outline, the width of the zones, and the angles of optical extinction in the successive zones. When the zones are more acid towards the exterior, the crystal outline is simple; but when the outer zones are the more basic the outline is more complex. K. Z.

WAHL (Walter). *Die Gesteine des Wiborger Rapakivigebietes.* *Fennia* (Bull. Soc. Géogr. Finlande), Helsingfors, 1925, vol. 45, no. 20, 127 pp., 15 figs.

Rapakivi-granite occupies an area of 20,000 sq. km. in the Viborg district and has the form of an intrusive sill (or plate). Two main types are distinguished: (1) *wiborgite*, in which the balls of potash-felspar are surrounded by a shell of plagioclase, and (2) *pyterlite* in which the plagioclase shell is absent. The balls are usually 3–4 cm. (exceptionally 27 cm.) across, and they consist of orthoclase or perthitic orthoclase, sometimes as a single crystal, but usually an aggregate of several crystals. The plagioclase shell consists of differently orientated crystals of oligoclase. 'Green rapakivi' consists of pyroxene- and hypersthene-granites, granodiorite (called *tirilite*), &c. The mica of the rapakivi-rocks is

a ferro-ferri-mica $\text{KH}_2\text{Fe}'''\text{Fe}''_3(\text{SiO}_4)_3$ called *monrepite*. The various views on the origin of the rapakivi structure are discussed, and that of the re-fusion of the felspar considered the most probable. L. J. S.

COOKE (H. C.). *Some chemical changes in rocks, caused by shearing.* Bull. Geol. Survey Canada, 1927, no. 46 (Geol. Ser. 47), pp. 22-30, 3 figs.

Nine detailed chemical analyses are given of a carbonaceous tuff and a greenstone and of the same rocks sheared along a fault. The effect of the shearing has been to eliminate constituents in excess of those required to form the schist-making minerals. L. J. S.

BROCH (Olaf Anton). *Gesteine von der Peter I.-Insel, West-Antarktis.* Avhandl. Norske Vidensk.-Akad. Oslo, Mat.-Naturv. Kl., 1927, no. 9, 41 pp., 4 pls., 8 text-figs.

Peter I island (lat. 69° S.) was visited in 1927 but a landing could not be effected. A detailed petrographical description is given of pebbles dredged from a depth of 6-7 fathoms close to the shore. These are mostly basalts, with some trachyandesites and andesites. Four chemical analyses are given of these rocks. L. J. S.

JUNG (Hermann). *Die chemischen und provinziellen Verhältnisse der jungen Eruptivgesteine Deutschlands und Nordböhmens.* Chemie der Erde, 1927, vol. 3, pp. 137-340, 183 figs. Reprints as Habilitationsschrift, Jena, 1927, pp. i-iv, 137-340, 183 figs.

A large number of chemical analyses of Tertiary igneous rocks from Germany and northern Bohemia, collected from literature, are tabulated and plotted on diagrams. Variation curves are given for each of the oxides. The rocks of the 'Oligocene province' are all alkali-rocks of the 'Atlantic type', whilst in the 'Miocene province' there are also lime-alkali-rocks of the 'Pacific type'. L. J. S.

WASHINGTON (Henry S.). *The italite locality of Villa Senni.* Amer. Journ. Sci., 1927, ser. 5, vol. 14, pp. 173-198.

The italite (leucite-rock) previously described [M.A. 1-161] was incorrectly stated to be from Rocca Monfina near Naples. It is the material that has been quarried as a potash fertilizer at Villa Senni in the Alban Hills, 14 km. south-east of Rome. The excavation is in a thick bed of volcanic agglomerate which contains granitoid blocks ranging from almost pure leucite-rock to pyroxenite. An intermediate type containing leucite and pyroxene in about equal amounts is called mis-sourite (although olivine is absent); this corresponds with the volcanic

rock albanite [M.A. 1-161] of the Alban volcano. Other rarer blocks consist almost wholly of biotite (called biotitite) and of a nepheline-melilite-rock. New chemical analyses are given of each of these rocks. It is suggested that these homoeogenic (rather than cognate) blocks represented fragments torn from deep-seated subvolcanic rocks (as distinct from plutonic and hypabyssal or dike rocks). They are compared with the blocks of Monte Somma, Vesuvius, which differ in containing feldspars, &c., but which are probably of the same origin. Clear glassy leucite from italite has n 1.508 (Na) with birefringence 0.001. Augite from missourite has $\gamma : c$ 46° – 51° (red $1\frac{1}{2}^{\circ}$ > blue), $2V$ 65° – 67° (red $\frac{1}{2}^{\circ}$ > blue), α 1.699, β 1.718 (1.713–1.722), γ 1.742, sp. gr. 3.410, analysis I. Black biotite from biotitite has $2V$ 20° (red) and 25° (blue-green), α 1.56–1.57, β and γ 1.61–1.62, sp. gr. 2.94–2.98, analysis II. A lighter coloured biotite has $2E$ 35° ($v > \rho$), α 1.563, β and γ 1.62; both this and the black variety are phlogopitic biotite. Melilite from the nepheline-melilite-rock is yellowish and transparent, optically uniaxial with ω 1.645, ϵ 1.63, birefringence 0.010, sp. gr. 2.975, anal. III. Analysis IV (mean of two) of italite shows a higher percentage of potash than in any hitherto known rock.

	SiO ₂ .	TiO ₂ .	Al ₂ O ₃ .	Fe ₂ O ₃ .	FeO.	MnO.	MgO.	CaO.	Na ₂ O.	K ₂ O.	H ₂ O.	Total.
I.	46.16	2.86	4.92	5.89	3.93	0.19	11.29	23.56	0.42	0.11	0.38	99.71
II.	37.53	1.51	14.74	4.93	3.02	0.33	21.83	0.15	0.92	10.35	4.78	101.35
III.	41.68	trace	9.86	2.61	4.32	n.d.	4.72	29.85	5.27	0.78	0.98	100.07
IV.	53.01	0.68	22.14	0.99	0.36	0.05	0.03	1.31	1.24	19.06	0.09	99.69

II, also F 1.26, total (less O for F) 100.82. IV, also BaO 0.18, P₂O₅ 0.18, SO₃ 0.32, Cl 0.05, ZrO₂ nil, (H₂O + 0.04, H₂O – 0.05).

L. J. S.

WASHINGTON (H. S.) & KEYES (Mary G.). *Rocks of the Galápagos Islands*. Journ. Washington Acad. Sci., 1927, vol. 17, pp. 538–543.

Chemical analyses are given of andesine-basalt and palagonitic tuff (consisting mainly of fragments of clear yellow glass with n 1.585) from Eden Islet, Galapagos Islands, Pacific. These rocks were described by C. Darwin in 1835, and later observers have also mentioned trachy-andesite.

L. J. S.

BOWEN (N. L.). *An analcite-rich rock from the Deccan traps of India*. Journ. Washington Acad. Sci., 1927, vol. 17, pp. 57–59.

A specimen labelled 'Deccan trap, NW. base of Ketool Hill, Cutch, India', shows a large proportion of a clear isotropic groundmass; this is analcime. Pyroxene is abundant as clusters of minute felted prisms;

olivine as small phenocrysts, nepheline, biotite, and ores are also present, but no felspar. The rock perhaps represents an analcimized nepheline-basalt or it may be a primary analcime-basalt.

L. J. S.

SHEPHERD (E. S.) & MERWIN (H. E.). *Gases of the Mt. Pelée lavas of 1902*. Journ. Geol. Chicago, 1927, vol. 35, pp. 76-116.

Detailed analyses are given of five specimens of hypersthene-andesite and of the gases evolved when chips are heated in vacuo. The volatiles include CO_2 , CO, H_2 , N_2 , A, S_2 , Cl_2 , F_2 , H_2O , and their amount ranges from 4.3 to 26.5 c.c. (at 1200°C . and 760 mm.) per gram of rock, being higher in the glassy varieties. On the average 80 % consists of water and 9 % of carbon dioxide. Analysis of the finely powdered rock may show as much as ten times as much water as the rock actually contains. The formation of pumice and the glassy surface of 'bread-crust' bombs is discussed.

L. J. S.

BLANCK (E.) & RIESER (A.). *Vergleichende Untersuchungen über die Verwitterung von Gesteinen unter abweichenden klimatischen Verhältnisse*. Chemie der Erde, 1928, vol. 3, pp. 437-452, 1 fig.

Comparative studies of the weathering of identical rock samples in different latitudes are scarcely practicable. Fragments of sandstone and of limestone were exposed to the weather during a period of five years at Göttingen and on the summit of the Brocken (1142 m.), where, owing to the difference in altitude, there are marked differences in the temperature, rainfall, and humidity. Detailed chemical analyses of the rocks and of the portions extracted by hydrochloric acid, both before and after the experiment, showed no appreciable difference in composition.

L. J. S.

BLANCK (E.) & RIESER (A.), with MORTENSEN (H.). *Die wissenschaftlichen Ergebnisse einer bodenkundlichen Forschungsreise nach Spitzbergen im Sommer 1926*. Chemie der Erde, 1928, vol. 3, pp. 588-698, 30 figs.

A study of rock weathering under arctic conditions. Numerous detailed chemical analyses are given of various rocks (sandstone, quartzite, clay-slate, phyllite, diabase, and calcareous shale) and of their disintegration products, including soils and muds; analyses are also given of the portions extracted by hydrochloric acid and by sulphuric acid from the debris. Chemical action in weathering is here retarded owing to deficient water circulation, and the action of frost is of more importance in breaking down the rocks.

L. J. S.

KLÄHN (Hans). *Süßwasserkalkmagnesiagesteine und Kalkmagnesiäsüßwässer*. Chemie der Erde, 1928, vol. 3, pp. 453-587, 27 figs.

A detailed account of travertine deposits (fresh-water limestones and dolomites), with a discussion of the conditions for their formation and the composition of the waters from which they are deposited. L. J. S.

LINCK (G.) & NOLL (W.). *Über Tutenmergel*. Chemie der Erde, 1928, vol. 3, pp. 699-721, 2 pls., 4 text-figs.

A discussion of 'cone-in-cone' structure in marls, including 'nail limestone', with descriptions of material from Thuringia and Roumania. Chemical analyses show that calcium carbonate is the main constituent, with considerable and variable quantities of clayey matter and free silica. The structure is attributed to the crystallization of calcium carbonate gel in the presence of much foreign matter. Comparisons are made with a similar structure shown by fibrous celestine pseudomorphous after gypsum from Jena [M.A. 3-486]. L. J. S.

ZERNDT (J.). *Mikroskopowe cyrkony jako minerały przewodnie.—Mikroskopische Zirkone als Leitmineralien*. Bull. Intern. Acad. Polonaise Sci. Lett., Cl. Sci. math. nat., Ser. A, Cracovie, 1927, pp. 363-377, 7 pls. [Cf. M.A. 3-383.]

Statistics are given of the crystallographic features (percentage frequency of habits, crystal-forms, and combinations of forms) of microscopic zircons in granites and porphyries from various localities. Similar data are given for the zircons present in the Carpathian sandstones, and deductions are drawn therefrom as to the probable sources of the material of these sedimentary rocks. L. J. S.

BRAMMALL (Alfred). *Dartmoor detritals: a study in provenance*. Proc. Geol. Assoc. London, 1928, vol. 39, pp. 27-48, 2 pls., 2 text-figs.

An account is given of the heavier minerals (also cordierite, quartz, &c.) found in the streams on Dartmoor and also separated from crushed samples of the granite. Details are given of their varietal features and relative frequency and of the inclusions present. Such information may be helpful in tracing the source of origin of the materials of sedimentary rocks. This assemblage of minerals is characterized by manganiferous garnet, titaniferous biotite, zoned zircon, monazite, and ilmenite, with tourmaline, cassiterite, brookite, and anatase; while magnetite, sphene, rutile, topaz, and fluorite are rare. Dumortierite as a few minute fragments was found in the detritals and in granite near its contact with slate. Topaz is figured as an inclusion in brookite. L. J. S.

SHANNON (Earl V.). *On the determination of alkalies in rocks and minerals.* Amer. Min., 1927, vol. 12, pp. 411-413.

Comments on the ordinary methods, with special mention of the possibility of contamination of the potassium chloroplatinate precipitate by ammonium salts. L. J. S.

SALVATORE (E.) & SQUEO (A.). *Über eine Neuerung bei der Ferrooxydbestimmung in Gesteinen.* Zeits. Krist., 1927, vol. 66, pp. 162-166, 1 fig.

The powdered rock with sulphuric and hydrofluoric acids contained in a platinum dish is warmed on an electric plate under a bell-jar through which passes a stream of dry carbon dioxide. The solution is titrated with potassium permanganate in the usual way. L. J. S.

Miscellaneous.

VAVRINECZ (Gábor). *Az első magyarországi pisanit.* Magyar Chemiai Folyóirat, Budapest, 1927, vol. 32, pp. 88-95, 3 figs.

VAVRINECZ (Gabriel). *Das erste Pisanitvorkommen in Ungarn.* [Summary.] Zeits. Krist., 1927, vol. 66, pp. 167-168.

Well-developed crystals and stalactitic efflorescences of pisanite were found on weathered rock and old timbers in the enargite mines at Reesk, com. Heves. On exposure to dry air the greenish-blue crystals soon become white and opaque. Three types of crystals were measured and analysed: I, stalactitic; II, acicular; III, short prismatic. They show the forms m (110), c (001), w (103), b (010), o (011), a (100), j (210), t ($\bar{1}01$), v (101), and the new forms i (810), k (530), u (502), ω (0.1.12), q (221), g (115), e ($\bar{1}2.12.1$), p ($\bar{1}11$). On crystals grown artificially additional forms δ (908), ϵ ($\bar{1}04$), h (112) were observed. The crystals show a zonal structure and are richer in copper in their outer layers; the composition given below is the average for the whole crystal.

	Molecular percentages.				Axial ratios.	
	CuSO ₄ .7H ₂ O.		FeSO ₄ .7H ₂ O.		$a : b : c.$	$\beta.$
(A)	100	...	—	...	1.1622 : 1 : 1.5000	74° 24'
1.	41.2	...	58.8	...	1.1694 : 1 : 1.5589	74 54
II a. }	35.6	...	64.4	...	1.1666 : 1 : 1.4936	74 54½
II b. }					1.1726 : 1 : 1.5623	75 37½
III.	34.4	...	65.6	...	1.1670 : 1 : 1.5468	74 28
(B)	—	...	100	...	1.1828 : 1 : 1.5427	75 44½

(A) Boothite (W. T. Schaller, 1903). (B) Melanterite.

[Compare Min. Mag., 1923, vol. 20, pp. 32, 36.]

K. Z.

VAVRINECZ (Gábor). *Borostyánskői pseudophit elemzése*. [Analysis of pseudophite from Borostyánkő.] Magyar Chem. Folyóirat, Budapest, 1927, vol. 33, pp. 185-187.

The following analyses are given of pseudophite from Borostyánkő (com. Vas) [= Bernstein, Austria; Min. Mag. 21-241]. I, compact, leek-green, and translucent in thin splinters. II, compact, dark oil-green, and only slightly translucent. III, yellowish-white or pale green fibrous material with silky lustre, occurring as small spots and veins in the compact varieties.

	SiO ₂ .	Al ₂ O ₃ .	Fe ₂ O ₃ .	FeO.	MgO.	CaO.	H ₂ O.	Total.
I.	32.82	17.37	0.34	2.47	34.38	0.17	13.08	100.63
II.	38.39	5.84	5.37	0.43	36.36	—	13.14	99.83
III.	39.55	4.15	2.05	—	38.85	—	15.18	99.78

K. Z.

PAPP (Ferenc). *A Bernece melletti Huszár-hegy hematitja*.—PAPP (Fr.). *Über ein Vorkommen von Hämatit bei Bernece (Kom. Hont, Ungarn)*. Földtani Közlöny, Budapest, 1927, vol. 57, pp. 27-32 (Hung.), pp. 112-117 (Germ.), 1 pl., 5 text-figs.

Near the village of Bernece on the eastern side of the Huszár Mt., in the NW. portion of the Börzsöny Mts., com. Hont, there is an occurrence of haematite of volcanic origin. The smaller (1-2 mm.) crystals are found in decomposed hypersthene-augite-andesite, and the larger ones (1-3 cm.) are embedded in a completely decomposed clay-like matrix. Analysis by J. Sürü gave Fe₂O₃ 99.52, TiO₂ 0.10; sp. gr. 5.31. The crystals are tabular parallel to *c* (0001), elongated along the edge [*cr*], and often show cavities on the *c* and *r* faces; observed forms are *c a r η d e μ n s* [Dana's letters]. Twins on *r*. K. Z.

ERDÉLYI (János). *Ismeretlen hidrosilikát-gél a székesfehérvári Rácban-nyából*. [Unknown hydrosilicate-gel from the Rác quarry near Székes-Fejérvár.] Magyar Chem. Folyóirat, Budapest, 1927, vol. 33, pp. 133-135.

In the SE. portion of the quarry the granite is coated with a soft pinguite-like decomposition product with grass-green colour and resinous lustre, or velvety lustre on the conchoidal fracture; H. 1, sp. gr. 2.36. It is soluble in concentrated hydrochloric acid. Analysis gave SiO₂ 39.54, Al₂O₃ 6.04, Fe₂O₃ 30.32, FeO variable, MgO trace, CaO 0.04, SrO 0.09, BaO trace, Na₂O 0.24, K₂O 0.32, H₂O 22.27 = 98.86. [Compare chloropal.] K. Z.

KOCH (Sándor). *A felsőbányai andoritról.*—KOCH (Alexandre). *L'andorite de Felsőbánya.* Ann. Hist. Nat. Musei Nationalis Hungarici, 1926, vol. 23, pp. 263–271 (Hung.), pp. 271–272 (French résumé), 6 figs.

KOCH (S.). *Neuere Beiträge zur Kenntnis des Andorits von Felsőbánya.* Centralblatt Min., Abt. A, 1928, pp. 28–34, 6 figs.

The western mines on the Gyulaköz lode at Felsőbánya [= Baia Sprie, Romania] yielded a drusy cavity (20–30 cm.) filled with plumosite in which are embedded numerous crystals of andorite. These are covered with small curved crystals of blende and fibres of plumosite. The crystals are usually grouped together, single crystals (2–15 mm. long) being rare. On fifteen measured crystals the forms observed were $abn\ i\ m\ l\ k\ x\ v\ \pi\ \gamma\ y\ t\ v\ p\ q\ r\ \beta\ D$ [Min. Mag., 11–286, 14–316] and the new forms T (450), F (052), G (072), H (092). The crystals are of two types: (1) tabular parallel to (010) with $b\ m\ q\ p$; (2) usually prismatic with dominant $m\ k\ b$, and terminated by many brilliant faces. A table gives the calculated co-ordinate (ρ and ϕ) angles for the 54 known forms of andorite. Analysis by E. Endrédy of the new material gave S 24.26, Sb 40.75, Pb 22.25, Ag 10.90, Cu 0.96, Zn 0.31, Fe 0.75 = 100.18, agreeing with the formula $\text{AgPbSb}_3\text{S}_6$. K. Z.

KOCH (Alexander) (= Sándor). *Bournonit von Ó-Radna. Vorläufige Mitteilung.* Ann. Hist.-Nat. Musei Nationalis Hungarici, 1926, vol. 23, pp. 395–396.

The material described is from a new find at the contact with the foot-wall in the 'Nándori' pyrite vein. Cavities show pyrite, blende, galena, and chalcopyrite, and on these minerals are crystals of bournonite embedded in plumosite. Polysynthetic and juxtaposition twins are common. The forms noted are $c\ b\ a\ e\ l\ m\ w\ a\ f\ i\ L\ d\ n$, (012), β , (032), $\Sigma\ x\ o\ z\ \delta\ \phi\ u\ p\ P\ \gamma\ g\ \rho\ \lambda\ v\ O$ [Goldschmidt's letters] and the new forms (091) and (11.0.1). K. Z.

LÖW [i. e. LÖW] (M.) & TOKODY (L.). *Zur Kristallographie des Bournonits von Óradna.* Centralblatt Min., Abt. A, 1928, pp. 105–113, 4 figs.

Associated minerals with bournonite at Ó-Radna, Transylvania [now Rodna-Vecse, Romania], are pyrite, galena, blende, quartz, and plumosite. Four types of crystals are distinguished: prismatic, prismatic with pyramid faces, repeatedly twinned ('cogwheel-ore'), and short prismatic

habit. On four measured crystals 40 forms are noted of which the following are new (502), (410), (720), (450), (881), (441), (11.11.3), (1.12.13), (7.8.15) [Dana's axes].
L. J. S.

TOKODY (László). *Magyarorsági stefanitok.* [Hungarian stephanites.] Math. Természettud. Értesítő, Budapest, 1927, vol. 44, pp. 296–317 (Hung.), pp. 318–320 (Germ. summary), 7 figs.

TOKODY (L.). *Über ungarische Stephanite.* Centralblatt Min., Abt. A, 1928, pp. 13–26, 7 figs.

Stephanite crystals from three localities in the Hungarian 'Ore mountains' (Érchegeység) are described, the third being a new locality for this mineral. (1) Selmeczbánya [= Schemnitz = Štiavnica in Slovakia].—The crystals are grown on massive quartz with chalcopyrite, pyrite, and quartz crystals. Five measured crystals (1–2 mm.) showed the forms $abc k d m U \pi \pi_2 J i_1 \phi \psi$ [Dana's letters; $\pi_2 = (140)$, $i_1 = (190)$] and new (6.11.0). Twins on (110) are common. (2) Hodrusbánya [= Hodruša in Slovakia].—Tabular crystals occur on quartz with blende, chalcopyrite, pyrargyrite, and dolomite. Only the small (0.5–1.5 mm.) crystals have brilliant faces. On nine measured crystals 28 forms were noted, of which (1.1.18), (3.3.11), (775), and (145) are new. The short-prismatic habit is more common, prominent pyramids and domes being rare. Juxtaposition and interpenetration twins on (110) are common, and only lamellar crystals are twinned on (130). Some crystals are terminated at both ends without hemimorphic development. (3) Vihnye (com. Hont).—A vein specimen shows the minerals pyrargyrite, pyrite, quartz, dolomite, and stephanite. One crystal (2 mm.) shows the forms $ct k d m i_1 M l P$ and others uncertain in the zones [110,001] and [010,001]. The crystal is of the pyramidal-brachydomal habit. A list is given of the 42 crystal-forms for stephanite from these Hungarian localities, with their observed combinations and relative frequency. K.Z.

ZSIVNY (Viktor). *Ásványtani közlemények.* Földtani Közlöny, Budapest, 1927, vol. 57, pp. 197–200, 1 fig.

— *Mineralogische Mitteilungen aus Ungarn.* Zeits. Krist., 1927, vol. 65, pp. 728–731, 1 fig.

1. *Dolomit Ratkó-ról.*—*Dolomit von Ratkó.*—The magnesite stock occurring in a syncline in Devonian slates near Ratkó, com. Gömör, grades outwards into dolomitic magnesite and then limestone. In the dolomitic magnesite are nests of coarsely spathic dolomite, sp. gr. 2.875.

This gave on analysis CaO 30.41, MgO 21.39, FeO 0.86, MnO 0.05, CO₂ 47.57, total 100.28, corresponding with FeCO₃.49MgCO₃.50CaCO₃.

2. *A gömör-rákosi kadmiumtartalmú rhodochrosit kémiai összetétele.*—*Die chemische Zusammensetzung des cadmiumhaltigen Rhodochrosites von Gömör-rákos.*—Rhodochrosite as small scalenohedral crystals (sp. gr. 3.70) on limonite from Rákospánya near Gömör-rákos, com. Gömör [now Rákoš in Slovakia], gave MnO 59.24, FeO 0.73, MgO 1.08, CaO 0.09, CdO 0.96, ZnO 0.15, PbO and CuO traces, CO₂ 38.36, total 100.61. Cadmium has not previously been recorded in rhodochrosite. L. J. S.

SLAVÍK (František) & VESELÝ (Václav). *Manganatý anthofyllitový asbest z Chvaletic.* [Manganiferous anthophyllite-asbestos from Chvaletice.] *Rozpravy České Akad.*, 1927, vol. 36, no. 46, 7 pp., 1 fig.

SLAVÍK (F.) & VESELÝ (V.). *Anthophyllite-asbeste manganésifère de Chvaletice en Bohême.* (Résumé du texte tchèque.) *Bull. Intern. Acad. Sci. Bohême*, 1927, pp. 64–70.

A greyish-white asbestiform mineral is found in small amount along fissures in compact manganiferous rocks near the contact with granite. The optical characters prove it to be anthophyllite: straight extinction, γ 1.652 parallel to the elongation, mean index $\perp c$ 1.633, 2V near 90°. Analysis by V. Veselý gave: SiO₂ 53.69, TiO₂ nil, Al₂O₃ 1.65, Fe₂O₃ 0.32, FeO 5.94, MnO 16.10, MgO 20.50, CaO 1.25, H₂O (+105°) 0.70, H₂O (−105°) 0.02 = 100.17, corresponding with 70RSiO₃.18R(Al,Fe'')₂SiO₆ + SiO₂, with R = 51Mg, 23Mn, 8Fe, 2Ca, 4H₂. The highest percentage of MnO hitherto found in anthophyllite is 4% in anthophyllite from Kongsberg, Norway. For comparison, the γ index was determined for other analysed anthophyllites from Czechoslovakia.

				γ .	(Fe,Mn)SiO ₃ .
Heřmanov (= Hermannschlag)	...	...	...	1.620	11.97
Stříbrné Horky	...	...	...	>1.625	15.14
Hrubšice	...	...	...	1.637	19.03

These and other data when plotted show a regular increase in γ up to 30% (Fe,Mn)SiO₃, agreeing with the results of N. L. Bowen [M.A. 1–170], but with more iron and manganese the determined values of γ are lower than those obtained by extrapolation along a straight line; on the other hand, the only determined value of γ for analysed gedrite is much higher.

F. S.